Industrial Finishing

An Independent Publication Devoted To The Finishing of Industrial Products

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With the Editor

COMPETITION is so keen among manufacturers that sales efforts have had to be increased and production costs have had to be decreased. Efforts in this direction have been remarkably fruitful for those concerns whose executives have been and continue to be alert to the possibilities offered by vast improvements in modern industrial finishing materials, methods, equipment and supplies.

Sales efforts have been aided by:

1—New and attractive color combinations and decorative treatment which can now be employed more lavishly and in greater variety at such low costs.

2—Greater durability of finishes—the lasting luster and permanency of color presented, and the fact that present-day finishes are not so easily damaged or harmed by spilled liquids, escaping fumes, abrupt changes in temperature, pressure of various kinds, etc.

3—Selling prices that are attractive to buyers.

Factory costs on the complete finishing process, as per unit manufactured, have been materially reduced by:

1—Shortening the time required for all finishing operations to be completed.

2—Cutting down the labor employed in the finishing department.

3—Reducing the floor space necessary for finishing, drying and temporary storage.

Progress in industrial finishing, therefore, has made available to manufacturers:

1—More attractive sales appeal for their products.

2—More economical production in their factories.

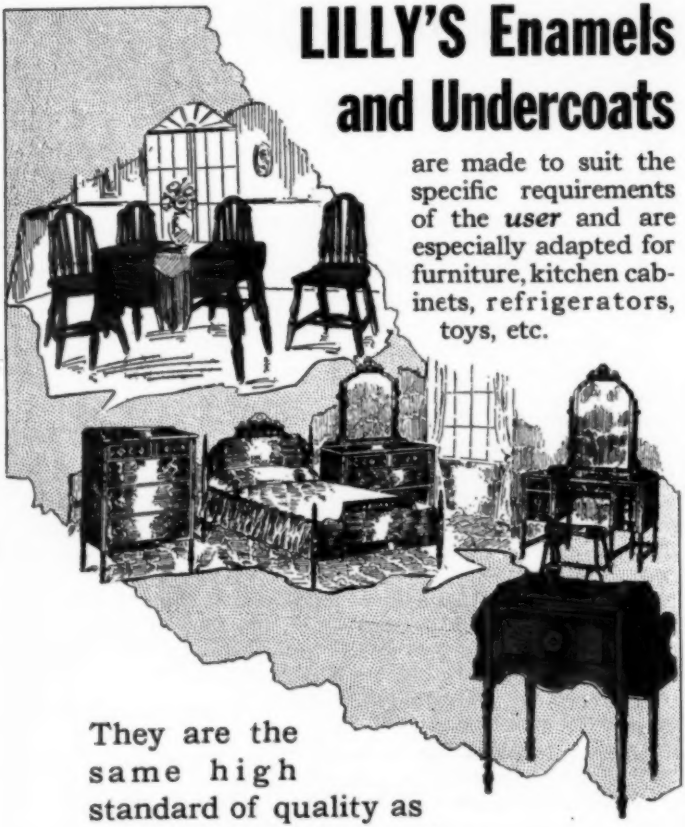
3—More profitable business for their organizations.

To properly take advantage of this continual progress in modern finishing, it is necessary for industrial management to keep well informed. Production executives will do well to read every article and every advertisement in INDUSTRIAL FINISHING, and keep all copies of the magazine for reference. Tomorrow's problem may be solved quickly, easily, and cheaply by what you read in INDUSTRIAL FINISHING.

W. H. Rohr

Managing Editor

LILLY'S Enamels and Undercoats



are made to suit the specific requirements of the ***user*** and are especially adapted for furniture, kitchen cabinets, refrigerators, toys, etc.

They are the same high standard of quality as Lilly Varnishes and Lacquers, and our comprehensive system of testing results in a uniformity that provides a dependable source of supply for the users.

Aviation—Finishing Problems and Modern Practices

Manager of Marine and Aviation Department at Berry Bros., Detroit, calls attention to the importance of finishes in aviation and outlines the usual finishing procedure as practiced in the majority of commercial airplane factories

By Thomas B. Colby

IN NO other field of industry is the necessity for "correct finishes properly applied" so great as that existing in the manufacture of aircraft. Here must come into play the ingenuity of chemists, paint manufacturers and finishing experts. Even scientifically-prepared finishes applied incorrectly may prove disastrous, while materials not adaptable to air craft use can never give the best protection that is a vital necessity to safe flying.

During the past three years this writer has had the pleasure and opportunity of devoting a major portion of his time to the perfection of materials and methods for the protection of commercial aircraft. In this relatively short period of time he has seen the Aviation Industry blossom forth from a nucleus of old worn and torn "Jennies" into the mighty business of aerial transportation that now is engrossing the world and stirring the imagination of young and old.

Early in 1925 there were only three builders of modern commercial airplanes in this country, turning out a very scant number of planes. But now one of these concerns produces five new ships a day; one plans a schedule for 1928 of one per hour and the third is over 600 planes behind in orders at this writing.

Thirteen airplanes, like the eight illustrated at the top of this page, represent two days' production in a certain modern aircraft factory.

A Promising Future

This tremendous advance in aviation gives those in the industry unbounded enthusiasm for its future. I cannot refrain from expressing belief that big opportunities await the finisher who will devote his sincere efforts towards the production of correctly finished aircraft. One airplane painter, who has "grown up" with his concern, now has charge of almost 30 men in the doping, varnishing and lacquering departments. This, too, in a three year old company! These planes have a nation-wide reputation for their beautiful and durable finish, reflecting credit on this man's ability and giving added impetus to the sale of these ships.

Aircraft finishing cannot be learned in a day. Auto painters entering this new branch of painting, should do so with an

open mind to receive the information they may need. Pyroxylin primers that may prove satisfactory on motor cars will not give the results obtained with good oil-base primers on aircraft work. Furthermore automobile lacquers do not possess the elasticity to withstand the constant vibration and bending of finished parts.

Aircraft lacquers are now available to fill this need, being prepared especially for use over metal and fabric surfaces. Several concerns have produced a complete line of aircraft finishes and have determined with accuracy the best system of protecting all integral parts of the plane. They also can provide detailed finishing specifications and directions for application.

With such aids available, the practical finisher has an opportunity at this time, and I feel safe in predicting that the intelligent painter who joins a well-managed aircraft company will prosper as he learns and as his employer's business grows.

The primary requisites of a man who would become an airplane finisher are:

1—A keen interest in the work.
2—The desire to learn and add to his ability in this profession.
3—A fundamental knowledge of dopes, varnishes and lacquers.
4—The ability to handle a spray gun.

Above all, "keen interest in one's work" is essential. Without this one is doomed to failure in any business; possessing it, success will be attained in spite of many obstacles.

During 1927 the writer visited every aircraft factory in the country and has had the opportunity of preparing finishing specifications for a majority of the commercial planes and for large bombers of the U. S. Army Air Corps. He feels that this experience and his other observations of the Aircraft Industry justify the statement that "here is an excellent opportunity for finishers who are looking for real jobs, plenty of hard work and advancement in position."

For the information of those interested in airplane finishing, I am listing in this article a brief outline of finishing procedure as practiced in most of commercial airplane factories.

Structural Steel Tubing

The insides should be rust-proofed with suitable treated oils for this purpose. In the past linseed oil has been used, but there are now superior preparations on the market for this purpose. This "oil" is forced through the entire interior of the tubing under pressure, allowed to drain and the tubing is then sealed against moisture.

The exterior of the tubing should be sand-blasted to remove all scale and rust before painting. Then apply one spray coat of red-oxide oil-base primer; when dry follow with one coat of lacquer. An alternative finish is two coats of aluminum bronze and spar varnish, 2 lbs. of aluminum powder per gallon of "spar" being recommended. The exterior of the longerons coming in contact with the fabric should be protected with a strip of tire tape. This will prevent the dope from "cutting in" to the finish and later allowing moisture to attack the metal.

Interior Construction; Metal

Metal planes, such as the one which recently carried Mrs. Lindbergh to Mexico, are con-

structed almost entirely of duralumin and must be thoroughly protected inside against corrosion. Suitable preparations and spar varnish tinted with Prussian Blue are used for this purpose. One light spray coat is all that is needed.

Wooden Ribs, Spars, Etc.

Only oil-base protective materials such as spar varnish and specially-prepared oils will give the adequate protection against decay on these vital parts. Rosin-base varnish, shellac and lacquers are only temporary and will serve merely to cover over the decay which may occur in the wood. Wise airplane builders use only recognized protective coatings for this purpose.

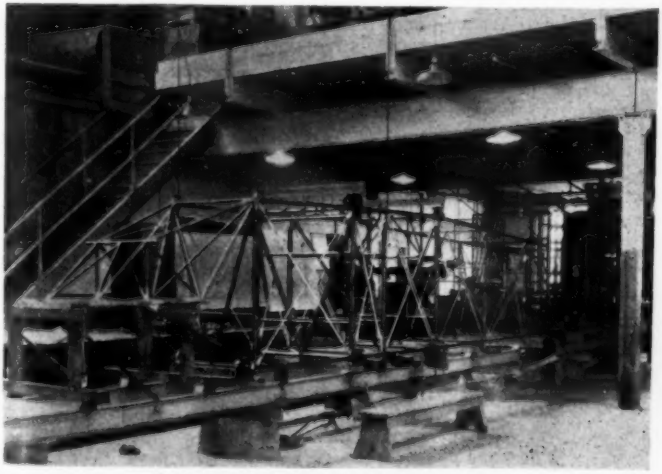
Exterior Metal Finishes

The metal should be first sanded and then cleaned with a metal cleaner as used in automobile body finishing. Keep the hands off clean metal until after it is primed! Use one thin spray coat of oil-base primer. Overnight drying should be sufficient. Baking in ovens is desirable when the equipment is available. Surfacers are not used in aircraft finishing to any extent, as the airplane metal is generally smooth, and their use would detract from the elasticity of the final coating.

High grade airplane lacquers for the final coats are available. These have a natural gloss and do not require polishing. Two or three coats are sufficient.

Fabric Finish

Dope the fabric with 5 or 6 coats of best grade nitrate dope. Allow 24 hours after the last coat before spraying on the lacquer. Remember that a smooth dope job is necessary if a smooth finish is to be obtained. Sand the



Typical steel body-frame for a modern airplane.

dope before lacquering, but do not "cut through" the high spots.

In using light grays, creams and maroons, ground coats give far better "covering" of the lacquer coats. Highly-elastic airplane lacquer must be used on the fabric and if an excessive amount is applied, cracking may result later. Experience will be the best teacher in this regard.

Aluminum Dope Finish

Apply 3 or 4 coats of clear nitrate dope with the brush. Mix 1¾ lbs. of aluminum bronze powder to 5 gallons of nitrate dope and brush on 2 coats. If spraying equipment is available, thin this aluminum dope with lacquer reducer or nitrate dope thinner to the proper spraying consistency. Three coats may be used.

Troubles That May Occur

Blushing: In humid or wet weather, nitrate dope and lacquer may "blush" (turn white). This is caused by moisture absorption into the film. A small quantity of anti-blush reducer, mixed with the dope or lacquer, will eliminate this trouble. If a "blush" remains at completion of the job, spray on one coat of lacquer reducer and anti-blush reducer mixed half and half. A fairly dry day should be selected for this operation.

Orange Peel: If the lacquer is insufficiently reduced or if the spray gun is held too far from the surface to be painted, "orange peel" will result. Cheap lacquer thinners tend to aggravate this trouble.

Pin Holes: Pin holes in a lacquer finish are caused by water or oil in the air line, entering the spray gun. Air lines and the air conditioning units should be kept clean and in first class condition at all times. Pin holes may also be caused by force-drying lacquer with heat.

Wet Areas: Oil, grease, wax, soap, etc., on a surface to be lacquered will prevent drying of the finishing coats. This further emphasizes the need to thoroughly clean all surfaces to be painted.

Blistering of Lacquer: This is caused by applying the lacquer in too heavy and wet a coat over the primer or over a priming coat that has not thoroughly dried. The only remedy is to remove and refinish the job.

Runs and Sags: These are caused by improper condition of spraying equipment or improper application of the lacquer. Excess material will "run" before it has time to dry.

Streaks in Paint Job: These are caused by uneven spraying and insufficient lacquer to give "covering." This can be eliminated by spraying coats in opposite directions, that is, one coat vertically and one horizontally. Real light colors require "ground coats" of pigmented nitrate dope on fabric, as do certain shades of reds and maroons.

Streaks will also show if the last coat of lacquer was insufficiently reduced. To eliminate, spray on a coat of three parts reducer and one part anti-blush reducer.

Equipping Aircraft Paint Shop

The chief requirements of an airplane paint shop are:

1—Adequate spray booths and exhaust fans.

2—Suitable racks for holding wings, cowling and other parts to be sprayed.

3—Air compressor and tank capable of maintaining at least 80

lbs. pressure in one or more spray guns during continuous operation.

4—Air conditioning unit, to remove oil and water from the air and regulate the pressure.

5—Lacquer and primer spray guns with extra quart-cup containers.

6—Pressure tank (for applying lacquer and dope when quantity is to be used) comes in sizes from 2 gals. capacity up. Can also be used to force "oil" through tubing.

7—Necessary quantity of air and fluid hose.

8—An air duster for removing loose dust and dirt from the work is almost indispensable.

9—Adequate containers for mixing lacquers, dopes, etc.

10—Proper lighting conditions must be provided to secure the best work. The premises should be clean at all times, to reduce the fire hazard and secure a finer finish on all work.

11—The finishing room should have a temperature between 70 and 80 deg. F., and be well ventilated. *Never use open flame heaters where lacquer or dope is in use.*

Coloring Varnish

Varnishes can be tinted by the aid of oil-soluble colors. The color should first be dissolved in turpentine or a similar solvent, then added to the varnish. Great care must be exercised, however, in tinting varnishes, for if certain colors are used, or if the quantity is too great, the varnish will not dry properly and furthermore, it will be quite brittle or rotten when it is finally hardened through and dry.

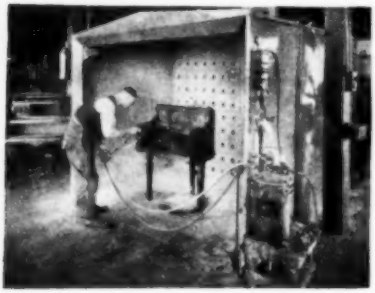
Where solid-covering color varnishes, such as those used on automobiles are wanted, it is customary to take a clear rubbing varnish and add japan colors to it. The japan colors are simply pigments ground in japan dryer to a paste form. The japan color must be thinned down with turpentine to a smooth consistency and then added to the color varnish.

The color varnish should be strained before it is used. Any thinning of varnish that may be necessary should always be done with nothing but pure gum spirits of turpentine for best results.—E. C. S.

Cleaning Up Varnished Surfaces

A varnished surface that has been rubbed with water and pumice stone can be washed with water to remove the slush. If the slight grayish cast which is sometimes left by water rubbing is objectionable, a light rubbing with oil and pumice stone or oil and rottenstone can be used to bring up a little higher luster.

Varnish surfaces can be rubbed out either with oil and sandpaper, water and sandpaper, oil and pumice stone, or water and pumice stone. The question of which of these methods to use is more or less a matter of personal opinion, taking into consideration, of course, the particular type of work being done. Waterproof sandpaper, with plenty of water, gives very good results for most work, when followed with some sort of operation to remove the scratches, such as a light rub with fine pumice stone and oil. If the finish is to be left as it is, rub out without any further coats. Where additional coats are to be applied, this final rub with oil and pumice stone or oil and rottenstone will not be necessary.—S. F. B.



Why this should be done, what to do when it is impracticable, and how spray booth interiors are covered with something temporary which can be easily stripped off when loaded with waste materials

Spray Different Materials in Separate Booths, Unless—

By C. F. Merrifield

IT is not considered good policy to spray lacquer and varnish intermittently in the same spray booth. This applies equally well to oil enamels and ground coats, or to any materials containing an oxidizable vegetable oil when applied in the same spray booth as clear lacquers, lacquer enamels or other products containing nitro-cellulose.

Different Deposits Dangerous

It is a well known chemical fact that when materials oxidize they generate heat. It is also well known that nitro-cellulose decomposes at a comparatively low temperature, and that the solvents used in nitro-cellulose lacquers are easily ignited.

If alternating deposits of oil-base materials and lacquer-base materials are applied one over the other, without sufficient time for thorough oxidization of the oils, sufficient heat may be generated by the oil materials to start spontaneous combustion of the lacquer layers.

Concerning this point we quote from Paragraph 41 of a pamphlet entitled "Pyroxylin Finishes," published by the National Fire Protection Association, 40 Central Street, Boston, Mass:

"Spray booths used in connection with the application of pyroxylin finishes should be used for no other purpose. If this caution is not observed serious results will likely occur for the reason that alternating deposits of pyroxylin materials, varnish, oil-base stains, ground coats, etc., make probable spontaneous heating and eventual ignition."

Clean Booths Frequently

This precaution is a good one to be observed wherever possible. If it is absolutely necessary to spray the two kinds of materials in the same spray booth, then the accumulated material on the spray booth and in the exhaust ducts should be cleaned off fre-

Photographs for cuts used in this article, supplied through courtesy of Binks Spray Equipment Company.

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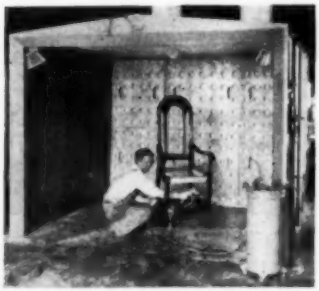
quently. While carrying on these cleaning operations only non-sparking tools—such as those made of wood and non-ferris metal—should be used to avoid the danger of striking a spark. It is advisable, also to wet down with water the surfaces to be cleaned during the cleaning operation.

Interior Coatings Used

Three general methods are in use to make it easier to clean the interior of a spray booth, without the necessity of doing a great deal of scraping. One of these systems calls for the use of vaseline or cup grease applied over all interior surfaces of the spray booth; onto the coating of cup grease, heavy manila paper is spread. This can be removed, carried outside of the building and burned at intervals.

Another system used is to coat the inside of the booth with a heavy coat of plaster of Paris or whiting, which is a brittle substance and can be easily scraped off. The third system includes the use of small supporting frames (usually of wood) constructed inside the spray booths. To these frames heavy manila paper can be tacked and readily removed at intervals, for disposal by burning outside of the building.



A clean well-lighted spray booth and clean equipment present an inviting appearance and encourage clean work.

Compressed Air Cleaning

In addition to these methods of keeping the booth interior clean, it is also a good plan to "blow off" the surface daily with compressed air at high pressure, while the ventilating system is operating. Exhaust ducts should be fitted with suitable clean-out openings on the bottom side, so the accumulation of spray dust can be cleaned out at frequent and regular intervals.

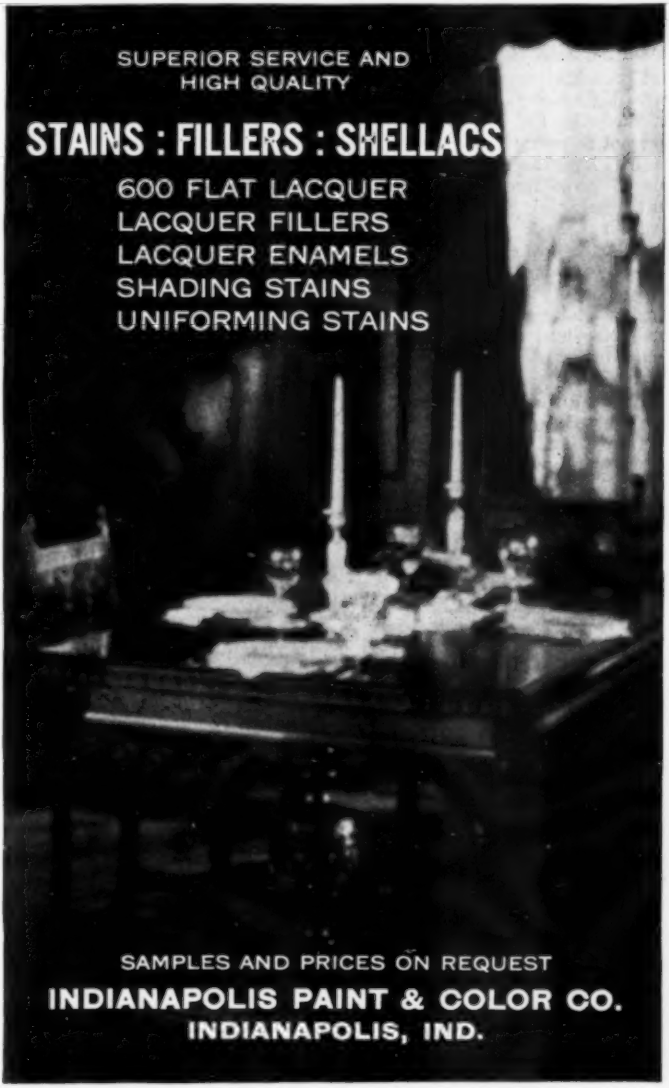
Finishing Saw Machines Attractively

Sawmill machinery would come in the class of rough goods if it were plotted along with automobiles, furniture, printing presses and the like. It goes out of doors, is placed in all sorts of temporary locations, and the work it does is comparatively rough in character. As a candidate for nice finishing materials and methods, the average man would rate it as a loser from the start.

But one manufacturer of drag saws and cross-cut saws does finish his product attractively.

His establishment employs some 40 men in the various departments of wood and iron work and a room about 15x20-ft. has been set aside for finishing purposes. Here the castings are painted in one section and the bulkier woodwork in the remainder.

Flywheels for saws are flat discs having a hub at the center and a heavy rim which is usually circular in cross section. A good average diameter is 24-in., and the weight may run as high as


SUPERIOR SERVICE AND
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150-lbs. for one wheel. The castings are finished in black and the wood parts in red.

Flywheels are dipped in an open tank and raised slightly out of the paint for draining. There are not so many wheels that time is a serious factor, so it is possible to leave the wheels hanging until the finish begins to set. An ordinary chain block is used to handle the wheels. Later, the wheel is raised further, swung over to one side and placed on a drying platform. A mixture of machine paint and coach varnish is used for this work. The wheels take their place in the final assembly with a hard shiny coating that gives them an attractive appearance and also serves as a splendid preservative.

Main frames made of heavy wood members, do not have many pieces more than 5 or 6-ft. long. On some machines there may be two heavy stringers 15 or 20-ft. long, but aside from these, the timbers are relatively short. These long pieces are brush painted on the assembly floor, but the cross pieces are all dipped before assembling.

Along one wall, two long tanks set rather low before a sloping bench some 2-ft. wide; this bench spans the space between the wall and tanks. Tanks are metal lined and the bench is similarly covered. One tank contains red paint and the other one contains varnish.

As the sticks come in from the wood shop, bored and tenoned, the truck is parked by the tank of paint. One finishing-room workman dips these sticks in the tank, holds them a minute to drain the big excess off, and then he racks them on end on the sloping bench along the wall. First he sets up a row against the wall and later places one or more rows in front of them, using narrow edgings of maple as cross stickers to separate the rows. The finish secured is a dull oil red which makes a splendid under coat.

The protecting coat is applied after the first coat has dried thoroughly. The red sticks are dipped in the second tank for this application and placed on end for drying in the same manner. The varnish is kept thin enough to drain acceptably, which means that it will dry hard in a minimum length of time.

The management of this plant has been fully alive to other methods of finishing, but has decided that the process outlined here is as good as anything they could adopt—taking all things into consideration. They use oil undercoats, which are acknowledged as equal to the best for such purposes. The investment in equipment is a mere trifle. Time has proved the coatings to be extremely serviceable against the elements, and the appearance is highly satisfactory.

What has been accomplished here is a good example of a careful analysis of work done in small quantities and the application of common-sense methods in the use of first-class materials.—D. A. Hampson.

Originality and artistic design are in demand in industry today.

U.S. Bronze Powder Works Open Chicago Warehouse

The United States Bronze Powder Works announces the opening of a Chicago warehouse and store room located at 545 W. Lake St., Chicago, Ill. The company's decision to open this warehouse is a result of the increased volume of business received from the west.

A new kind of Lacquer

—the effect of varnish with the speed of lacquer

Every manufacturer is bound to be interested in the new Murphy *Flexible* Lacquer.

If you are now using mostly lacquer, you will be glad to know that *Flexible* Lacquer will do everything that ordinary nitrocellulose lacquer will—*and much more.*

If you are using mostly varnish, you can still enjoy the particular advantages of varnish and at the same time put your production on the speed basis possible with lacquer.

In studying the following points on Murphy *Flexible* Lacquers, keep your own particular kind of work in mind and realize that these flexible lacquers are adaptable to almost every sort and condition of work:

1. The basis ingredient of Murphy *Flexible* Lacquers is NOT nitrocellulose.
2. They build far better than lacquer.
3. They rub with a pull like varnish.
4. Polish at great brilliancy, getting still clearer with age.
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6. Like varnish they have a plastic resistance to the expansion and contraction of wood. No humidity checking.
7. They give the appearance and "feel" of varnish.
8. They are waterproof.
9. They look and act like varnish; they dry and wear like lacquer.

We urge that you learn all the facts as soon as possible so that you may apply this revolutionary finish to your product at the earliest moment.

Write for demonstration, or for more information.

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Famous for 63 years among architects, master painters and makers of products requiring a fine finish.

Air-drying and Baking Varnishes

Enamels, Lacquers and Stains for Brushing and Spraying and Dipping.

"My company, in which I have been foreman finisher for the past four years, was the first to our knowledge in this part of the country to finish complete store fixture jobs in the clear lacquer finish. The first complete job has been out almost three years now and has already stood up better and looks better than the old varnish finish. Of course, we had our little troubles; in fact, one very serious trouble.

"We refinished one complete store job because of poor lacquer undercoat, but all these troubles have been overcome and for the past two years, at least, everything has gone very smoothly, although I learn something new every day about lacquer finishes.

"I have also had my experience with paint primers and pyroxylin primers under lacquer enamels, on both wood and metal. I have found places where lacquers and enamels do not fit in as yet."—

E. B. Smethers

Finishing Store Fixtures

Foreman Finisher of The Storekraft Mfg. Co. tells why the company adopted lacquer finishes and modern spray equipment; explains the merits of lacquer for this work and the procedure of finishing followed

By E. B. Smethers

ABOUT three years ago increased business swamped our finishing room. We had employed all the help that could be used to good advantage in our limited floor space. The varnish had to have its drying time, so quicker turnover was impossible without building another finishing room. The manager called me into his office and showed me the blueprints of several complete fixture jobs that had to be installed within a very short space of time. It would have been impossible to get out the work in such a short time with a varnish finish and the facilities then available in our factory.

Unknown to him I had been experimenting with several wood lacquers from reputable companies and was well pleased with the tests. I explained the lacquer finish to him at this time, putting special stress on its quick-drying qualities, durability, etc.

Lacquer Finish Adopted

To make a long story short, compressors, air conditioners, spray guns and wood lacquers were all ordered by wire that same day. A temporary booth to accommodate the largest size counters was constructed and a single 16-in. exhaust fan was installed to take care of ventilation and waste spray.* In a week's time we were turning out lacquered store fixtures. All installations were made in good time, due to the new lacquer finish.

*Editor's Note: For booths 16, 18 and 20-ft. across the front, it is customary to use at least two and sometimes three or four 16-in. fans, or one 30 or 32-in. fan, to provide adequate suction within such a large enclosure. For lacquer spraying especially, many finishers prefer to have the fans located comparatively low—being centered, say, only 2 or 3-ft. above the floor.

When these fixtures were lacquered the material consumption —that is the lacquer itself—ran as high as 50 percent more than the old varnish finish. This depends a good deal on the style of fixtures being sprayed. Buffet wall cases, cigar cases, and articles that have a very small wood area to be finished, naturally take more lacquer, proportionately, than the large flat surfaces, such as counter tops and fronts. However, a much quicker turnover, eliminating the sanding between coats of lacquer, the saving of labor and material in crating, and many other items—these more than overcame the small extra cost of lacquer material.

The marring of our varnish finish in shipping had been a very serious problem with us. We used a good grade of varnish and employed the utmost care in packing and crating, but some of the unsightly mars would always show up when unpacked at the other end. Since using lacquer, this trouble has been completely overcome, although the crating is done with less care than before.

In all classes of fixtures, special care should be used in sanding and preparing the surfaces. A good finish cannot be obtained unless the wood surface is sanded correctly and smoothly with the proper grades of grit used.

Water Stains Used

Water stains are used altogether in our fixture finishing, which necessitates a sponging operation, using just enough warm water to moisten the wood, and with very little pressure. This raises the fibers of the wood which, when dry, must be sanded smooth with very sharp sandpaper, such as No. 3-0 garnet, but you must know when it is sanded enough. Too much sanding, and the wood will be in the same condition it was before sponging, the abrasive having cut through the fibers down to the unsponged wood. After a thorough cleaning —which is best done with air, especially in the case of open-grain woods—the surface is ready for staining.

Water stains are best applied with a bear hair brush bound in rubber. The brush must be well filled with stain, but not overloaded; the stain must be applied evenly and quickly, being careful not to pile up the color at the ends of strokes.

Shellac As a Sealer

There is great difference of opinion as to the use of a coat of shellac. The writer has used a very thin coat (4-lb. cut shellac diluted four to five times with denatured alcohol, 188 proof, formula No. 5) for many years. This operation stiffens the fine wood fibers so that they can be cut off very easy with No. 3-0 garnet paper, care being taken not to cut through the stain.

In cases where pine, fir, beech, magnolia, or other soft woods are used on lower-priced fixtures, a heavier coat of shellac, or better two thin coats, is used. The material consumption on all such woods would be almost prohibitive, without using a good sealer. One coat of flat wood lacquer, or in some cases a coat of gloss lacquer followed with a flat, gives a passable and notable finish.

Wood Fillers

The pores of open-grain wood must be filled properly under lacquer, and herein the finisher may run into lots of trouble and many

problems. The old oil fillers are not desirable because of the solvent action on the oil. Whiting and silica made into a paste, with a minimum amount of oil and drier, can be used to good advantage. In come cases dyes and stains are added to fillers to give the wood a stain effect with very good success. The writer has obtained best results by buying a filler already made, especially for using under lacquer, manufactured by a reputable company.

A coat of shellac—a very thin coat of shellac—can now be applied after the filler is thoroughly dried, although I prefer to spray the pyroxylin directly over the filler.

It might be emphasized at this time the importance of a good filler. Imperfect filling causes pin holes, ruining the appearance of the finish, as lacquer has no filling qualities whatever. If a good job can not be obtained with one filling, the surface should be gone over the second time, allowing drying time between operations.

Gloss and Flat Lacquers

A first coat of gloss lacquer, followed by a finished coat of flat lacquer, makes a very good looking and durable finish for the lower-priced line of fixtures.

The medium-grade fixtures are given two coats of gloss lacquer wet sanded thoroughly with No. 280 Trimite paper, and finished off with a coat of flat lacquer (not too flat). If the trial finish on a sample piece shows the finishing flat lacquer to be "dead" in appearance, add enough gloss to make a rubbed effect, any degree of luster being obtained by so doing. I have had samples of this finish chosen in preference to rubbed finish. To the inexperienced eye it is very hard to detect the difference, providing the lacquer has been sprayed with correct air pressure and by a good operator.

Rubbed Finish

In the case of a rubbed finish the surfaces are given three or four coats of lacquer; the next to the last coat is wet sanded with No. 280 Trimite paper, after which the surface is thoroughly sponged and cleaned and given the final coat. This gives an excellent surface and does not require so much rubbing as would be necessary without the wet sanding operation. The wet sanding can be done on the last coat and followed by the rubbing with pumice stone and oil or water, merely cutting the dirt nibs off between coats of lacquer with a dry garnet paper.

Finishing Interiors

The insides of the buffet wall cases and all other fixtures, to be enameled inside, are given one coat of clear lacquer as a sealer, followed by a coat of pyroxylin filler, wet sanded and finished with two coats of lacquer enamel in the proper colors. The outside finished coats are protected by masking with paper tape especially manufactured for this purpose.

H. V. Walker Co. Moves Into New Factory

Henry V. Walker Co. of New York City, manufacturer of finishing materials, announces the transfer of manufacturing operations from its plants at Jersey City and Belleville to the new plant at Division St. and Woodruff Lane, Elizabeth, New Jersey, where the equipment includes every modern facility.

The interiors of such beautiful diners as this are finished only with the highest grade varnish . . . .

. . . and this same varnish is unexcelled for such fine furniture as this.

For 68 years we have been making the best varnish that can be bought—our varnish is used extensively on the finest railway coaches, sleepers, diners, parlor cars, etc., and although we have made no great effort to sell to furniture manufacturers, it is an ideal finish for those concerns making high grade, high priced furniture.

If you manufacture a high grade, first class product—and want a perfect finish for it—try our varnish. Sample on request.

THE THRESHER VARNISH CO.

DAYTON, OHIO

VARNISH——ENAMEL——LACQUER

Cabinet Finishing; Defects in the White

Pointing out how some of the numerous and "trifling defects" in wood surfaces cause serious trouble and added cost as the finishing process gets under way, or immediately after it is completed

By J. K. Cooper

OCCASIONALLY we hear something about a poor cabinet finish (a poorly smoothed surface in the white) causing an unsatisfactory final finish. A good final finish can never be made unless the work comes from the cabinet shop in first class shape. It seems to be the idea of many cabinet foremen that lacquer, varnish, enamel, paint, or whatever finish may be used, will hide any kind of a defect.

Defects in the White

This is true, in a way, with some kinds of finishes, but there are many defects that slow up production and make the final finishes costly. Of course, if they can get away with it, this reduces the cabinet cost. There are various things that cause a poor surface finish in the white; for example, poor and coarse sanding, scraper marks, dull or nicked machine and bench cutting tools, places that had a plane run over them with short strokes, leaving every mark, wax used for filling up small holes or joints, etc.

Wax under lacquers will easily be detected, as there will be a soft spot wherever it is used and it will not dry. I've seen this one little thing cause a lot of costly trouble in a finishing department; after being stained and lacquered these spots had to be picked out and filled in again with other material.

An indelible pencil mark on any cabinet work, especially when lacquer is to be used, will cause a lot of trouble. It leaves a purple mark which will bleed through, and can only be removed by cutting through to the wood and scraping out the mark.

Of course, in a good many cases all of these things are the result of one department putting something over on the other, or "passing the buck." With the present day dull finish, a lot can be overlooked, as this hides many defects. A paint job will show up certain defective surfaces more than a stain and varnish job.

These troubles are found not only in furniture, but in high-class panel jobs. Often a poor scraping or cleaning job will make a beautiful wood look dirty or streaked. I've seen many a panel job spoiled by taking a few more scrapings off of one piece than another. Every time a scraper goes over a piece of wood, the surface will appear a shade lighter in color; of course this sounds almost impossible but it has been proved.

Result of Hand Scraping

I saw a high-class panel job where the wood was all hand scraped on a bench and filled before being put up. After being filled one part was darker than another. This was taken back to the foreman who said it had all

SPRUANCE QUALITY

If You Want Good Wood Finishing Products

Varnishes	**Fillers**
Lacquers	**Stains**
Enamels	**First Coaters**

We can supply you with the best on the market.

That word "best" we want to qualify. Everyone claims theirs is the "best"—it is obvious that they can't all be the best.

But—

We are one of the oldest manufacturers of wood finishing products, we know that we use only the finest ingredients, and that the heads of our various departments are recognized experts of long standing.

Our products, therefore, must be good—we say, "the best".

THE GILBERT SPRUANCE CO.
PHILADELPHIA

"A FINISH FOR EVERY PURPOSE"

received the same treatment. After some argument he finally scraped half of the dark portions and refilled the surfaces again; this brought them up even with the color of the lighter portions. The same treatment was tried on other pieces with the same result, so he is convinced that the deeper you scrape the wood surface, the cleaner and lighter you get your finish.

All these seeming trifles, if overcome in the cabinet room, would save many trying hours for the finisher and also save dollars for the finishing department. It is always easier to remedy these things before two or three coats of lacquer go on, than to do so afterward, as oftentimes these lacquer coats must be removed before being "doctored." There is nothing gained by "passing the buck," as it nearly always goes back to be fixed, eventually. Do your work right the first time and a better result will be obtained all the way around.

Expert Staining; Skillful Brush Work

Instructor of Wood Finishing classes at the Grand Rapids Vocational and Technical High School explains the planning and execution of skillful staining by brush application, in connection with finishing furniture

By R. F. Daniels

THE question often arises as to what stain to use. Now, I am not going to discuss all the different stains thoroughly in this article, but I believe that practically every finishing foreman knows that spirit and oil stains will usually fade to a certain extent, due to the chemical process that the dye must pass through in manufacture. So far as I know, this difficulty has never been overcome, therefore, the most logical stains to use (in meeting successfully certain restrictions and conditions) would be the water and chemical stains.

Methods of Application

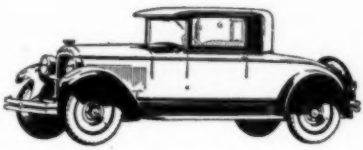
The method of applying stain differs in different factories. For instance, it may be brushed, sprayed or dipped. In brushing there is first the proper method of holding the brush. Of course, something depends on the size, but in practically every case the brush is handled the same. The brush should be held in the right hand, with the thumb on one side of the brush and two or three fingers on the other side, differing according to the size of the brush. An expert brush hand works with a wrist movement only.

Where and How to Begin

The work must be planned in advance, remembering that in practically every instance the top must be done last. One must first learn to hold the brush right; then learn to divide the article

WLP

NITRO-JET
SUPER
BLACK



Automobile Finishes

Oil Primers
Lacquer Surfacer
Colored Lacquers
Satin Blacks
Striping Lacquers
Reducers

Furniture Finishes

581 Clear Lacquer
Flat Lacquers
Colored Lacquers
First Coaters
Flat Oil Finish
Flat Varnish
Rubbing and Polishing Varnish
Clear and Colored Spirit Enamels

WILLIAM LILLY PAINT CO.
INDIANAPOLIS, IND.

into convenient sections. Take, for instance, a dresser or chiffo-robe.

Always begin at the left end of the piece facing you. Apply as much stain as the wood will hold, putting it on any way that is rapid and easy—so long as you cover the whole surface; then drain the brush as dry as possible and "straighten out the stain," always brushing with the grain of the wood.

Laying Off the Stain

There are several methods of draining a wet brush for use in laying off the stain properly. One is to press the hair part of the brush firmly against the edge of the stain container, drawing it with pressure from the base of the brush to the tip. By doing this two or three times the brush will be drained almost dry.

Another method—and the one I have found to be the best—is to swing the brush back behind me and then pull it forward with a sudden jerk. By doing this two or three times I can jerk most of the stain out of the brush, and it is ready for use in laying off the work.

Routine Procedure

Having laid off the left end (legs also included) I now proceed with the front. The first thing is to apply the stain all over, the same as with the left end, and then lay it off. I pull the drawers out about 6-in. from their place and stain the top edges and the end grain of the fronts. Then I apply stain all over the fronts of the drawers and lay it off the same as the end of the case.

The right end and back of the case are stained in exactly the same manner. The top comes last and is done in exactly the same way as the ends. In each case I apply as much stain as the surface will hold and then lay it off or remove the surplus with a "dry brush," brushing with the grain.

If there is any two-toning to do on the case, it must be done after the stain is dry; otherwise it may have a tendency to run and leave a ragged or feather edge.

The finisher must always bear in mind that when laying off his work, the brush should be as dry as possible and the stain should be laid off as lightly as possible. The brush should just touch the surface enough to absorb the surplus stain and in this way eliminate all the brush marks which, if left visible, will show through the final finish.

To Get Deeper Penetration

If it is desirable to make the stain dry fast and penetrate deeper into the wood, add about ½-pint of denatured alcohol to a gallon of water stain. The alcohol will also help to better dissolve the stain crystals or powders. If still deeper penetration is necessary or desirable, add about ¼-oz. of lye to a gallon of water stain.

V. J. Dolan to Build

V. J. Dolan & Co. of Chicago, Ill., manufacturer of finishing materials, has purchased its factory site and property at 1830-2 No. Laramie Ave., Chicago, and contemplates building an addition at a very early date.

Binks Detroit Office Moved

Binks Spray Equipment Co. of Chicago, announces that the Detroit office, formerly located at 7366 14th Ave., has been moved to larger quarters in the Convention Hall, 4456 Cass Ave., and it is managed by C. W. Sanders.

Uniformity!

RED S. FLAT VARNISH
will give you uniform results every time.

Whether your finish demands Oil Rubbed effects—Dull Rubbed finish or Dead Flat sheen each shipment will be the same as the previous ones.

May we tell you more about this reliable Flat Varnish?

THE SCHAEFER COMPANY
1315 West Kentucky Street
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Manufacturers of
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What It Takes to Get a Good Finish—I

First installment of a two-part article in which it is pointed out clearly and logically what elements enter into each step of the entire finishing process and why each one must be "right" to produce a satisfactory "ultimate result"

By T. E. Moorefield

WHETHER the article is a toy, a piece of electrical equipment, a radio cabinet, a chair, a piano or an automobile, appearance is one of the greatest appeals to the purchaser. This compelling "appearance appeal" is obtained by a judicious combination of design, workmanship, and finish. And when all is said and done, the finish is probably the most important factor of the three in creating this good appearance appeal, for the design may be ever so good but if the finish is not right, attractive appearance will be lost. On the other hand, even though the design may not be of the best, good workmanship and a good finish will often create the buying urge which, otherwise, would be lacking. A good finish can redeem a poor design, but nothing can hide a poor finish.

Factors That Make Results

The question of a good finish depends upon several factors, the five principal ones being 1—materials, 2—methods, 3—equipment, 4—conditions, and 5—manpower. Each of these factors is so important that if it were left out of consideration there would be grave danger of spoiling the finish. In a certain sense, however, if the fifth factor—manpower—is of the proper quality, the other factors will be pretty well taken care of, for it is the manpower in an industry that insures other factors being right.

Not only the finishing materials, but also the wood, metal or other materials used in the construction of the object have a bearing upon the finish. The wood or metal must be clean, it must be smooth and it must be well suited to the occasion. For example, the finest of mahogany may be used but if it is not properly sanded the finish will not be satisfactory. On the other hand, soft, spongy, inferior wood may be treated ever so carefully and still the result may not be a good finish, because it is not suited to the finishing materials or methods being used.

Suitable Finishing Materials

Finishing materials have a very important bearing on the result and should be carefully chosen. In the old days it was necessary for each finisher to be the manufacturer also of many of his finishing materials. This is not necessary or desirable today, for the larger and more reliable paint, varnish and lacquer manufacturers have made careful studies of the requirements of various industries and have a full line of ready-prepared materials especially made for the various coats and types of finishes.

These manufactured products are produced from the best raw materials, gathered from the four

Finishing Materials *to match Design and Workmanship*

INFINITE care in design and accuracy of workmanship must be matched with high grade finishes to reach the measure of superiority that is required today in furniture and other cabinet work.

In the lines of many leading furniture manufacturers—

Amerilac No. 96 Gloss
Amerilac No. 97 Rubbed Effect
Lacquers

Are presenting finished surfaces that establish instant sales appeal, coupled with lasting beauty and durability after products reach consumers. Amerilac No. 96 and No. 97 Lacquers also meet the requirements for lower finishing costs in the factory.

Color chart and complete information on request

The American Varnish Co.

1138-1146 N. Branch St. Chicago, Ill.

VARNISHES, STAINS, FILLERS, ENAMELS

PYROXYLIN FINISHES, LACQUER ENAMELS

SUPERIORITY UNIFORMITY

[ADVERTISEMENT]

Since the advent of pyroxylin finishing materials, the question of easy rubbing has come in for a great deal of discussion. It has such important bearing on what happens to the product after the product leaves the factory that the following short discussion by Mr. L. P. Nemzek should be of interest to finishing foremen, sales managers, and other executives.

What Price Easy Rubbing?

Manager of Industrial Sales of E. I. du Pont de Nemours & Co., Inc., frankly discusses what happens when durability is sacrificed to easy rubbing in pyroxylin finishes.

By L. P. Nemzek

MANY finishing foremen doubtless wonder why some pyroxylin finishing materials are harder than others to rub. They have often asked the question, "Why is it not possible to make a pyroxylin finish which is as easy to rub as the old type rubbing varnishes?"

The answer to these many queries is that actually it is possible to make a pyroxylin with fine working qualities, but in doing so it is absolutely necessary to sacrifice the very thing that has made the present day lacquers popular, namely, durability.

Flexibility and Rubbing

The ready acceptance of Duco has been largely due to the fact that it is immune to checking and cracking.

Put in other terms, it is flexible. It expands and contracts with the wood surface that it covers. A film that is flexible does not rub as easily as a film that is brittle. That is readily understandable.

But a brittle film, a non-flexible film, will not expand and contract with the wood surface it covers. It will, in other words check, crack or craze.

Advantage only Apparent

The du Pont Company has steadfastly refrained from sacrificing flexibility for the sake of some apparent advantage to be gained by the slightly easier rubbing quality.

Our files are filled with evidence that this policy is one in which farsighted manufacturers may reasonably concur.

The largest manufacturers of cash registers in the world tell us that they saved in one year $16,000 worth of packing material because Duco gave them a greater wear-resisting finish. This is but a typical case demonstrating the tremendous advantage of a real hard, durable finish even before it reaches the point where it is offered for sale. *Advertisement.*

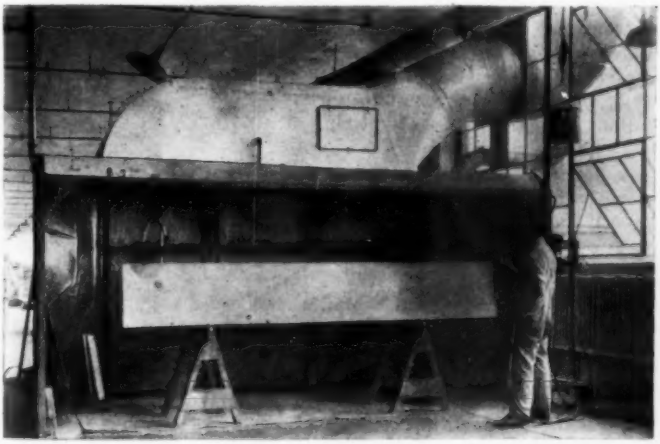
corners of the earth and scientifically combined in the proper proportions for the best results. The raw materials are carefully tested each time a new shipment is received and the quality is held to a strict standard. Modern, up-to-date machinery and manufacturing methods, are used.

Men of long experience in making finishing materials for all purposes build their experiences into the products to make them easy working, durable and well suited to the particular object on which they are to be used. Continuous experiments are carried on to improve each product and careful tests are made of each batch before shipment, to insure uniformity.

Avoid Making Your Own

The individual finisher cannot expect to have accessible so many raw materials, nor the equipment and experience to combine them as well as men who do nothing, day in and day out, but manufacture paint, varnish or lacquer products. Furthermore, the finisher cannot manufacture any finishing material of a given quality at a lower price than he can obtain it from a reliable manufacturer, if he counts into the cost the value of his time, his overhead and such expenses in addition to the cost of raw materials.

It is dangerous for the finisher to do any appreciable amount of hand mixing of products, other than perhaps the preparation of his own stains from ready-made stain powders. Of course, it is necessary and permissible for him to reduce each of his coats according to instructions from the manufacturer, but he should not substitute another material for the reducer furnished or recommended by the manufacturer, for it may contain ingredients



Plenty of light and ventilation are essential for clean high-grade finishing at a fast pace. The discharge pipe from this booth elbows upward outside the window and extends vertically to a point above the roof.

that will not harmonize with the ingredients of the finishing material.

Harmful Mixtures

It is a serious mistake to mix materials of different manufacture when "building a finish." Some people make a practice of purchasing the materials for their various coats from several sources of supply, where they can obtain "the best price." They receive what they believe to be the best quality for their money, yet it sometimes happens that no matter how good each individual material may be, they are not properly constructed to harmonize with each other in building up a permanent finish.

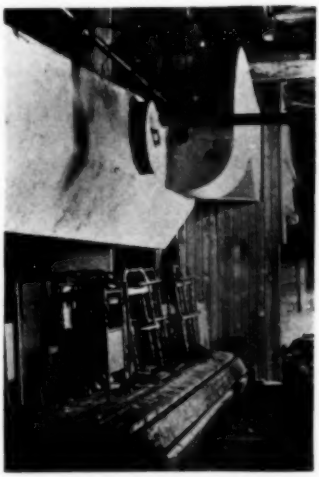
For example, a rubbing varnish may be a very good one within itself, but if it is "longer" or more elastic than a polishing varnish that is used over it, the polishing varnish will not expand and contract as readily as the rubbing varnish with changes of temperature and moisture content of the wood; as a result the polishing varnish may check, crack or show other defects.

The quality of a finish does not depend entirely upon the quality of the individual coats, but upon the suitability of these coats for use one on top of the other so they harmonize perfectly. No matter how good the varnish or lacquer may be, if the stain or filler is not properly suited for use under it, the results will not be lasting.

Building a finish is like building a house; everything from the foundation to the roof must be of good quality and also each part must fit with every other part to make a complete, permanent structure. Like a chain, a finish is no stronger than its weakest part; if one coat fails the entire finish fails.

Same Material—Different Results

Recently I submitted a sample of finishing material to an industrial finishing foreman, to have it tested. I received a report that the material proved unsatisfactory. Previously I had very good success elsewhere with the same goods on the same class of work. I decided to submit another sample of the same material, but labeled differently. His next report was satisfactory; same material, but different results.—J. C.



A factor in low cost production on novelty furniture in one establishment includes great wood-slat conveyors which carry freshly-coated articles very slowly through drying rooms.

FLINT
LACQUER PRIMER

. . . . is the ideal foundation for your clear lacquer finishing. It sands more easily . . . . dries more quickly . . . . is more durable . . . . and knits perfectly with succeeding lacquer coats. Flint Lacquer Primer *will not cloud the grain* under clear lacquers.

Flint Lacquer Primer is the only clear lacquer first coater that has passed satisfactorily the rigid test of widespread industrial use over a long period. The steadily increasing demand for Flint Lacquer Primer has proved definitely the value of this undercoating to users of clear lacquer finishes.

If you are not already using Flint Lacquer Primer, write today for a free working sample . . . . or we shall be pleased to arrange a demonstration at your convenience.

MAYER & LOEWENSTEIN
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Leaders Since 1846

"I cannot see the criticism of salesmen. I have found them, as a rule well informed, courteous, tactful, and always willing to be of help even though they may not directly benefit by the transaction. There are some, of course, who are practically unbearable, but they are handled in the same manner that others of the same nature are handled — no matter what their calling happens to be."—

Time Spent in Buying and Selling Finishes

Production superintendent of a St. Louis factory gives his version on interviews with salesmen and declares that interviews, properly handled, result profitably for the concern

By E. F. Werner

THE JANUARY issue of INDUSTRIAL FINISHING contained an article entitled, "Time Wasted in Selling and Buying Finishes." The author, Mr. C. Dan Youngs, brought out several points that are especially true and, on the whole, most of the objections outlined occur—if one permits them to. Time is needed for any phase of the daily routine of a plant, and the purchasing of materials is as important as any other branch of the executive's duties.

This article deals with the small or medium-size plant—not the plant that has a purchasing department, chemical laboratories, etc.—the plant in which the superintendent directly supervises the purchasing of materials, or delegates this purchasing to some one individual—possibly the finishing-room foreman. Naturally, in such cases, purchasing is only a part of the man's several duties, and the time he spends away from other matters is limited.

Some individuals, in charge of departments or factories, feel that they are doing a salesman a favor when they grant him a few minutes in which to explain his products; at times they may cut him short with a curt and uncivil answer. No finisher foreman or superintendent knows it all, and frequently more information can be obtained from salesmen than from any other source. Time can be wasted in a factory department or in the office, if one is inclined to waste it, so why blame the salesman if an interview lasts too long. The man who permits a salesman to talk much longer than necessary is as much to blame as the salesman.

Twenty Salesmen Call

Our establishment is located in the St. Louis district. There are possibly 15 to 20 men, representing absolutely first-class reliable concerns, who call on us and endeavor to sell us finishing materials. Naturally, it is impossible to purchase materials from all of them and actually only about five men get our business. The other salesmen have products which in all probability, are

THE BIG IDEA

—in wood finishing is transparent finishes. Opaque colors are going out and stains are coming in. Buyers want color, but instead of covering up the wood they want its natural beauty accentuated in gorgeous colors.

This demand for color has reached the kitchen. Tables, chairs and kitchen cabinets finished in pastel shades that bring out and enrich the beauty of wood are all the vogue.

Marietta's New Finishing Specifications for Maple, Birch, Beech, Oak and other native American woods meet the requirements of the most exacting buyers. They represent an amazing development and are the last word in wood finishing.

This transparent color idea is *your* Big Selling idea.

Write for full information on Marietta's transparent color finishes.

MARIETTA PAINT & COLOR COMPANY

Marietta, O. Columbus, O. High Point, N. C.

as good, with a range of prices that compares favorably with those that are now being purchased. It is also true that if samples were taken from each of the men when offered, it would keep one or more men busy all the time trying out the various lots; the confusion and delay in production would be a serious one.

Good Sales Psychology

Why should a salesman stay away from a plant? It is his bread and butter to make as many sales as possible. If the superintendent or foreman were out of a job, would he hesitate to apply for a position with any company that he knew had a superintendent or a foreman? In most cases, if it were not possible to get just exactly what he wanted, necessity might prompt him to take the next best thing. So it is with salesmen. If they cannot sell the main article used, they hope to offer something else; perhaps it is small or of little actual "return value" at the time, but it furnishes an opening wedge that might in the future lead to larger and more profitable returns.

Every salesman is entitled to a courteous interview, not necessarily from the standpoint of politeness alone, but from the fact that it is good business to do so. Salesmen who get around from plant to plant, unconsciously absorb a great fund of knowledge, some of which might be of help to some company without in any way injuring the concern from which the information was obtained. The line of business might be altogether different, yet each and every organization has certain problems that are similar.

Sources of Information

Methods of handling goods in the plant, transportation between departments, trucks and skids upon which parts can be placed, drying rooms, racks, methods of spraying, layout of rooms, etc.—these and a hundred other mechanical problems alone might be explained to advantage. The dipping of pencils in one plant, or the spraying of showcases in another, might give an idea which would prove beneficial to the manufacturer of ice boxes. The use of lower-grade merchandise —or possibly the reverse—might give lower unit costs in the final analysis.

Salesmen know they cannot sell everyone, but they hope to be allowed to present their products in the most favorable light, in order to get an entre. The point stressed in this day and age is service, and the bringing in of information that might be of value, is one way of rendering service.

Few men, who sell merchandise in a plant, call oftener than once a month. The reliable salesman knows that the mere pressure of repeatedly calling will not sell his merchandise, and if his presence becomes obnoxious or burdensome he has practically no chance to sell. Altogether, the 20 men who call on our company, in behalf of finishing materials and equipment, will not average more than ten minutes to a call, and if 3½ hours per month is too much time for any one to spend in order to keep up with present day methods and procedures, then there is something lacking in the organization he is connected with.

Few Salesmen Are Pests

It is true that some men stay longer than necessary. It is

—is more than its own excuse for being—it's one of the most important, most vital sales considerations. Where beauty must be combined with every practical need of use, wear, and application, Glidden is prepared to give you material and suggest the methods to this end. Glidden service is always at your command for help of the utmost practical importance.

GLIDDEN

EVERYWHERE on EVERYTHING

The Glidden Company National Headquarters, Cleveland, Ohio

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equally true that the buyer, especially if he has other duties, can easily say, "I am sorry, but I must be getting back to the work in the plant," and the interview is ended. It is up to him, then, to carry out his intentions and leave the office if the interview takes place there, or if necessary, to politely excuse himself again.

If the caller is really a pest, then the next time he calls the interview can be stopped more abruptly and, if necessary, a blunt statement may be given to the effect that nothing is wanted. Altogether, there are probably 40 men calling on us in the sales line, and of these there are only two could be classed as pests. They are handled accordingly and that naturally means that they do not and will not get any business.

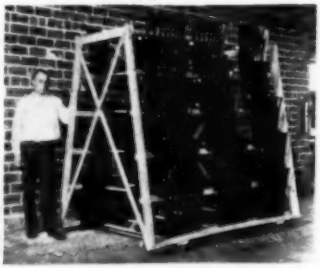
So I say that if salesmen are too much bother, check back on your conditions and it will, in most instances, be quite apparent that they have been allowed to run loose to such a great extent that they are bothersome. However, always keep in mind that if salesmen are handled properly, they can give valuable information which will more than pay for the small amount of time required to interview them.

Using Varnish Remover

The kind of remover to use depends a great deal upon the surface on which it is to be used, the finish that is to be removed and various other conditions. The most commonly used removers for either varnish, shellac or lacquer finishes are the liquid removers on the market which are patented and which, for the most part, consist of a small quantity of paraffin wax added to various solvents such as acetone and benzol to keep the solvent from evaporating too readily and thus allowing it to attack the old finish.

The wax which is left on the surface by this type of remover must be thoroughly removed before the refinishing operation begins, to get good results. This is especially true if lacquer is to be used for refinishing, as wax is a great enemy of lacquer; the two do not work well together at all. For this reason, in removing the finish on automobile bodies, it is sometimes customary to use a caustic solution which, of course, must be thoroughly washed off before any coats are applied, or the caustic will very seriously damage the finish. Caustic cannot be used so successfully on wood because of its penetration into the wood and being difficult to remove entirely.—Rem.

The employment of mechanical equipment lightens the task of the worker, even though it may enable him to do more work in the course of a day than he otherwise could do.



This multiple-deck, portable rack was developed for use in the finishing department of an office-chair factory where it has proved to be very useful. It enables the foreman finisher to utilize room height as well as floor space to accommodate volume production.

The Alcohol Test on Finished Surfaces

Lacquer expert and authority discusses the "alcohol test" sometimes used on finished surfaces and explains how certain elements of unfairness, involved in the use of denatured alcohol for this purpose, may lead to unsound conclusions

By Dr. S. P. Wilson

MAKERS of furniture, particularly those specializing in office desks, chairs and tables, are often confronted by the prospective buyer with the so-called alcohol test of their finish. They, in turn, put the problem up to the manufacturer of the lacquer or varnish they use. Apparently no one has questioned the soundness of the test as applied, and the writer believes it worth while discussing the test in some detail.

The test usually is made by pouring some denatured alcohol on the finish, allowing it to evaporate, and then examining the finish to see whether or not a perceptible ridging marks out the area covered by the alcohol, whether the finish has turned gray or smoky, or if the gloss has been affected. Sometimes the tester will rub the surface with a rag while it is still wet with alcohol, the ensuing smudging and smearing of the softened finish sometimes appearing very dramatic.

Why is this test made? On vanity dressers, chiffoniers, etc., the possibility of perfume, which is chiefly alcohol, being spilt thereon and thus damaging the finish is the reason back of the test. On office furniture there is always the possibility that beverages will be spilt and, despite laws and regulations, office beverages are still largely alcoholic. The same conditions confront dining room and library tables, as well as buffets. Logically, then, alcohol's action on the finish demands investigation.

Destructive Severity

The alcohol used in the tests is almost invariably straight 188-proof, denatured alcohol of one of the completely denatured formulas—usually No. 1 or No. 5. This contains about 94 percent alcohol and denaturant and the balance water. Alcoholic beverages, even of the most potent sort, seldom exceed 50 percent or 100 proof, and generally run far lower in alcohol. Consequently, the usual alcohol test in no way simulates what is actually going to be spilt on the furniture. Much furniture and much lacquer and varnish have been condemned by an arbitrary test that really only tells what would happen if some one poured radiator alcohol over the dining-room table—a rather infrequent occurrence.

Pure ethyl alcohol cannot be considered a solvent for lacquer, and is only mildly active on most varnishes. Denatured alcohol, containing wood alcohol which generally contains acetone, is a comparatively active solvent. Even this, however, when diluted with water to equal volume so as to match a brandy of 100 proof,

has practically no action on any good lacquer or varnish, including many that would show up rather badly on a test with full-strength alcohol.

Use Diluted Alcohol

It is the writer's firm belief that a test with this diluted alcohol would be a decisive one for either the furniture buyer or manufacturer to use. It is true that finishes have been developed that stand up well even under 188-proof alcohol but, in most cases, other qualities have been sacrificed to attain this. If the trade can be convinced of what the actual test should be, a much wider choice in finishes will be available.

The problem of alcohol in perfume is different. This alcohol is pure cologne spirits, not denatured, and in itself would scarcely cause any trouble. On the other hand, certain of the perfumer's essential oil and fixatives are rather good solvents and it is these that do the damage. The test for perfume should be done with a drop of real perfume, not with denatured alcohol or toilet water.

For Cleaning Brushes

A great deal depends upon what material has been used in them. Varnish, paste wood filler and similar materials containing oil can be cleaned out by washing the brushes thoroughly with turpentine or kerosene. Shellac, lacquer and similar materials, which contain ingredients that are not soluble in turpentine, must be washed out of the brush with a solvent of the materials contained in the original product.

Denatured alcohol can be used quite successfully for shellac, but it will not work so well for lacquer because all of the ingredients of lacquer are not soluble in alcohol. It is much better to use a lacquer reducer, as furnished by the lacquer manufacturer, for cleaning lacquer out of the brush or out of the spraying equipment.

Neither denatured alcohol nor lacquer reducer should ever be used in an attempt to wash out a varnish brush, a filler brush or a paint brush, unless the varnish or paint has been allowed to stand in the brush until the brush is quite hard. As mentioned before, lacquer cannot be very successfully brushed. Wherever a brush is used for applying it, however, the brush should be cleaned out only with lacquer reducer, as furnished by the manufacturer for his particular product.—C. E. Fortner.

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Industrial Sales Manager of Kuehnle, Inc.

Mr. H. D. Wright, formerly connected with Glidden Co. and also with Hildreth Varnish Co., Inc., New York, has been appointed industrial sales manager of Kuehnle, Inc., paint manufacturer, Philadelphia, Pa.

New Sales Promotion Manager for Valentine & Co.

Robert E. Mitchell has recently been appointed sales promotion manager for Valentine & Co., manufacturer of Valspar varnishes, enamels and lacquers. He was formerly a Valentine district sales manager and, previous to that, had spent several years in advertising and promotion work.

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EDITORIAL

What "Scratch Proof" Lacquer Stirred Up

A very short item on page 92 of November (1927) INDUSTRIAL FINISHING entitled "Scratch Proof Lacquer?" brought forth quite a flood of inquiries (notwithstanding the "?" mark) to the editor's desk and these, in turn, were relayed to the San Francisco concern supposed to be making this material. Eventually, we were given further information on this matter and we feel that what we learned through later investigation will be of more than passing interest to readers of INDUSTRIAL FINISHING. Accordingly we quote from a letter dated January 23 from a finish manufacturing concern in Ohio:

"We were among those who wanted to know something about the goods and the writer therefore had the matter investigated on the ground, with the result that he has a report from there, as follows, namely: that the fellow who claimed to have made the material did his business in a garage and through the unwarranted claims that he made for his new material, which he claimed to have discovered, he secured a lot of jobs for refinishing of cars. However, for some reason not stated, the work turned out very unsatisfactory and because of that we understand he went broke and has now been out of business for the past several months."

Our letter in reply to this included the following:

"Of course, this is news to us and naturally we appreciate being informed about it, as it is far from our intention to exploit anything that is questionable or which doesn't exist. The item about this was sent in by one of our correspondents in Oakland, Calif.

"We questioned the claim implied, as is indicated by our question mark in the title and we made very brief note of it far in the back of the book (page 92), so we feel that we didn't endorse it nor give much prominence to it.

"The object of the item was rather a suggestion of what might be a future possibility, and, judging from the number of inquiries we received, such a lacquer would certainly find a ready market—if it really were "scratch proof".

Supplementing the above our Oakland correspondent, whose articles appear frequently in INDUSTRIAL FINISHING and who is assistant Pacific Coast manager for a manufacturer of finishes in the east, wrote also:

"In the last paragraph of his reply to you, Mr. Rohr has clearly expressed the ideas back of this news note—that of a suggestion for a possible development, rather than a statement of something already developed and acknowledged to be a fact. Had either Mr. Rohr or myself believed this to be a new development in the industry, worthy of mention, it would not have been handled in

the semi-ironic manner which it was.

"I am frank to state that my information was gathered from news items in Coast trade magazines and daily newspapers, and no investigation of this firm's claims was made by me. To me, it was merely a point of passing interest, and I personally was surprised at the wide-spread interest this small article occasioned. However, this feature in itself, brings forth the thought that there is a wide-spread interest in anything new pertaining to the lacquer industry, and that INDUSTRIAL FINISHING is one of the best mediums for arousing such interest."

The editor of INDUSTRIAL FINISHING feels grateful to both of these gentlemen for the information and comments supplied and it is more than probable that readers of INDUSTRIAL FINISHING will find the information of value, also. In the meantime, we may all speculate on when, if ever, a lacquer will be developed which can be properly called "scratch proof" and which can be announced in INDUSTRIAL FINISHING without a question mark appearing in the title.

More About the Teaching of Finishing in Schools

Referring to page 70, of January INDUSTRIAL FINISHING,* I note with pleasure that other localities are awakening to the necessity of training young men in the art of painting and decorating, so as to take over the work of the passing master painter.

Some four years ago the master painters of North Dakota approached authorities of the North Dakota Agricultural College with the proposition of installing a course to train young men in the art of painting and decorating.

The college authorities saw the need of such a course and immediately took steps to co-operate with the master painters in giving a course that would train young men in a short time, where formerly it required many long tedious years of apprenticeship. The apprentice, as a rule, knew no more and no other methods than those of his master. Our present course is taught by a master painter of wide experience.

The course requires six hours a day, of which two hours are spent in theoretical and technical instruction, and four hours of actual application.

Our students are instructed in all the art and technique of inside and outside painting, the matching of colors, mixing of paints and elementary decorating during the first course. Many of these young men return for a second course, and, in addition to continuing the study of decorating, they have access to our thoroughly-equipped spray booth, which is used in connection with the regular four-year college course in paint, varnish and lacquer technology.

Many of these young men, after completing the second course, go out and contract for themselves. It is the general consensus of opinion that the course is meeting a much-felt need.—L. L. Carrick, Acting Dean, School of Chemistry.

Commercial laboratories have contributed profitable suggestions to industry. In one case, by decreasing the evaporation of an expensive chemical, $500 a day was saved.

*See also February issue, page 68.

"There are a few seemingly small details that the average automobile painter might overlook, so I will try to give a few pointers along this line."—

L. A. Johnson

Refinishing Motor Cars in Lacquer

Chicago automobile refinisher gives a number of practical suggestions on how to refinish motor cars successfully and economically with modern nitro-cellulose lacquers

By L. A. Johnson

AUTOMOBILES can be refinished with lacquer at as low cost as they can be refinished with paints and varnishes. This, perhaps, is contrary to an erroneous opinion held by many custom paint-shop owners who, at the present time, are not using lacquer and those who have used it but have not taken the time to study its possibilities.

Personally, I believe that lacquer is here to stay and will be used more and more in the refinishing of automobiles in the next few years to come. Therefore it will pay anybody to extend a little extra effort in its direction.

There is nothing very complicated about lacquer. Anybody that has a little common sense and has any knowledge about paint can soon become an expert in the use of lacquer.

Paint removers, wax, grease, rust, dirt, oil and polish will not mix with lacquer; their presence under the lacquer film causes most of the trouble found while finishing, and after the car has been out on the street for a while.

One of the cheapest yet most important tools that is used is a small stiff-bristle brush, employed to scrub out corners around mouldings, etc. On burned-off jobs, be sure to remove all traces of remover; any that is left on will keep the succeeding coats from drying. If wet spots appear on the surface, due to some remover having been left on, a cloth soaked in clean high-test gasoline and softly patted on these spots will dry them up.

Fillers and Primers

Building up of the undercoats is very important. Fill all file marks, bruises, etc., as any of these will show, since lacquer does not fill but magnifies. Be sure that fillers are thoroughly dry before putting any lacquer on, as fillers that are not dry will crack, peel, chip and check when the lacquer is applied to them.

Do not make the mistake of putting on too much filler—just use enough to fill file marks, etc. If it were not for these and if the metal were perfectly smooth, filler would not be needed. A good coat of primer is a thousand times more important than filler, as this is the bond between the lacquer and the metal.

While speaking of primer I might say that a little care used in applying primer to the metal will pay well in the good results

attained. A light, even coat, free from runs and sags, is the beginning of a perfect job. This can be either brushed or sprayed.

When rubbing filler, avoid the use of coarse sandpaper, as scratch marks will show. Use plenty of water and rub in one direction; by doing this the fine scratches will run in one direction and are not so noticeable in

The refinishers at work.

the final finish. Some fillers are rubbed with water, some with gasoline and some with a rubbing liquid. I can't advise you just what to use here, but if you will consult the manufacturer of the filler you are using, he will set you on the right track.

Cleanliness is Important

Keep all spraying equipment clean and in good working order. It is best to have one gun for filler and another one for lacquers.

Be free with the use of the air; it doesn't cost much. Blow out all dirt and moisture from around the windows, behind mouldings and from all cracks and crevices; moisture left here will cause the lacquer to break away. Any dirt left in these places will come out when you are spraying and cause you a lot of unnecessary work when the time comes to polish the completed job.

Mixing Materials

Do not overlook the selection of lacquers and thinners, and the mixing of same. It is better to pay a little more for these materials at the start than in the end —with loss of trade and added labor. Most lacquers will stand a thinning of about 50 percent—some more and some less. Experiment a little and you will soon get the knack of doing this correctly.

Mix up enough material to complete the job on hand. This saves time and you will be sure to have the same color throughout the job. A gallon lacquer can, with the top cut off, makes a good mixing receptacle. Keep this clean.

As you put on each succeeding coat of lacquer, add more thinner, and for the final coat use 90 or 100 per cent thinner. This does away with orange peel appearance and makes the surface easier to polish.

Use clean soft polishing and wiping cloths. A dirty, greasy cloth will cause a lot of harm, both to your health and to the finished work.

When applying lacquer on top of paint, mist coat the first two coats and leave them dry before putting on any wet coats. When the old finish has been lacquered, spray on a coat of thinner first. This will soften up the old finish and the following coats will adhere better.

Never sandwich oil coats between lacquer coats, and never use oil primers and fillers over an old lacquered surface.

Final Appearance

Last but not least, pay a little attention to the final cleaning up of the job, the striping, etc.

Dirty windows, partly-cleaned running boards, smeared-up nickel plating, finger marks all over the surface, and dozens of other small items will spoil the looks of the whole job, regardless of how good the work has been done on the rest of the car. These things will disgust the customer, and they are the first things he sees. Small defects in the work on the body and fenders will, nine out of ten times, escape his attention.

Do not become discouraged if you have a little trouble at the start; practice makes perfect. Remember that lacquer is beyond the experimental stage and you have at your disposal the technical staff of INDUSTRIAL FINISHING, and the manufacturers whose advertisements will be found throughout its pages. Consult them at any time; they will be glad to advise you on any matter you do not understand.

Consult Finish Experts

Paint, lacquer and varnish manufacturers, for the most part, employ one or more expert finishers—men who are well seasoned in the art of finishing furniture on a small scale or on a production basis. Since these men frequently travel from factory to factory, they have an opportunity to pick up new ideas from time to time, and wise furniture manufacturers keep in constant touch with them.

The average paint, varnish and lacquer manufacturer has in his employ an expert finisher who does nothing but experiment in his own laboratory or testing room and, as I have stated before, wise manufacturers of furniture, or other articles requiring some kind of a finish, will do well to keep in close, constant touch with these technical men.

Furniture manufacturers have been known to complain about the materials and methods offered to them by lacquer and varnish makers, declaring that the goods and processes were too expensive. No paint or lacquer maker can know just how much his customers and prospective customers can afford to spend in finishing their goods but, if they should make known to the paint expert the amount they can afford to spend, the paint expert will readily work out a finish that the manufacturer can efford to pay. And, customarily, there is no charge for this service.

Seemingly difficult problems have been quickly and easily solved after manufacturers of furniture or other goods had talked over their problems (confidentially if necessary) with paint or lacquer experts.—H. J. C.

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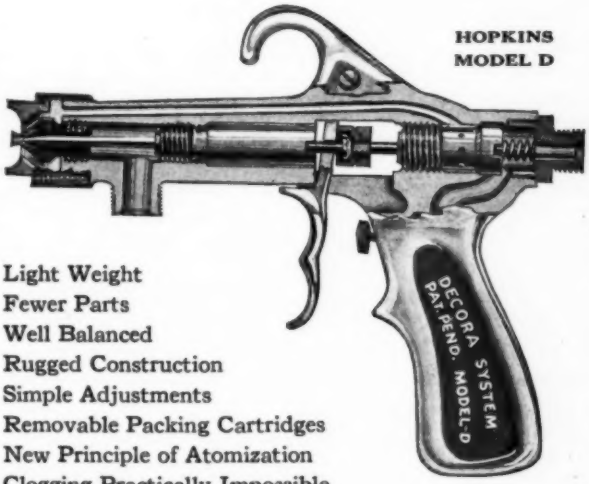

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Modern Aluminum Finishes

Explaining what aluminum paints consist of, what vehicles are used and in what proportions, and how to use aluminum paints on various kinds of industrial painting and finishing jobs

By Edwin S. Woodward

MODERN INDUSTRY requires and demands that the finisher's work be done more quickly and at a lower cost. New processes, materials and ideas must be used. The modern finisher has solved these problems by dipping and spraying operations, as well as by the use of lacquer and the special enamels and varnishes.

Aluminum paint, made with either an oil or lacquer vehicle, is being called upon by the finisher to solve some of his problems; the remarkable increase in the use of this material shows that it meets the requirements of modern industry.

Aluminum Bronze Powder

Aluminum bronze powder is a unique pigment. A stamping process is employed to hammer out the pure aluminum metal until it is in the form of minute flakes. These tiny flakes are carefully graded for fineness by sifting, through seives ranging from 120 to 240 meshes to the inch. Then this material is given a finish polish by a special process in which a small amount of special polishing material is used as a medium and lubricant. This completes the manufacture and we have the tiny, highly-polished flakes of aluminum bronze powder.

Leafing

When a varnish vehicle is mixed with this polished-aluminum bronze powder, many of these flakes come to the surface of the paint film and form a continuous coating of polished aluminum. This action is descriptively termed "leafing." It is usually desirable to mix the aluminum paint the same day it is to be applied, as the ability of the metallic flake to leaf freely is gradually lost on standing in the mixed paint.

Vehicle Portion

Aluminum paint is made by mixing a proper vehicle with aluminum bronze powder. The type of vehicle and the grade of aluminum bronze powder used, as well as the proportion in which they are mixed, are determined by the result desired. A long-oil spar varnish is probably the most popular type of vehicle used in obtaining an aluminum finish, since its spreading characteristics and drying time are usually satisfactory, and the resulting coat will wear well under nearly all conditions.

As a general rule, two pounds of aluminum bronze powder should be mixed with one gallon of the varnish vehicle. When applying this paint over a porous surface, where there will be considerable absorption, 1½ lbs. of aluminum bronze powder to one gallon of vehicle will give a suitable sealing coat.

Aluminum bronze powder works very well with pyroxylin lacquers. As a rule, about one

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GOOD products were once closely guarded behind locked doors. Jealously secreted, none but the elect could see them any closer than—through the keyhole.

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pound of bronze powder to a gallon of lacquer will make a suitable aluminum lacquer. The writer has had the opportunity of inspecting an aluminum lacquer application over iron that had been previously electroplated with zinc. About one half pound of bronze powder was used to a gallon of lacquer on this job, and a very attractive coating was obtained. The aluminum flakes do not leaf in lacquers, since they set and dry so quickly.

When called upon to produce an inexpensive, quick-drying, one-coat application—where durability is not essential—an aluminum paint made by mixing 1½ to 2-lbs. of aluminum bronze powder with one gallon of gloss oil-type vehicle may serve the purpose. Even one coat of this paint will hide and cover well.

This paint is not recommended for general practice, since the "weathering" qualities of gloss oil are very poor. This vehicle might be improved by adding a small amount of kettle-bodied linseed oil and thinned to the proper viscosity with mineral spirits if necessary.

A Polished Aluminum Surface

A highly-polished aluminum surface may be obtained by lightly rubbing and polishing aluminum bronze powder with a chamois or cloth over a smooth varnished surface, which is slightly tacky. Better results will be obtained by first applying a coat of aluminum paint and, when dry, sanding the surface smooth. After this, the one coat of clear varnish is applied and dusted with aluminum bronze powder, as just mentioned, when the surface is tacky.

Protected from Sunlight

Sunlight is particularly destructive to the vehicle portion of most paints. The ultra-violet rays of the sun hasten the oxidation and hardening of the paint film. This shortens the life of the coating and, in time, causes the disintegration of the paint film. Since there is a continuous coating of polished aluminum on the surface of an aluminum paint film, the destructive rays of the sunlight are reflected and prevented from acting upon the vehicle.

Even though aluminum bronze powder does not leaf in lacquer, its addition to lacquer will greatly increase its durability on exterior exposure, since the aluminum flakes are opaque to sunlight.

Maintenance Work

When the problems of maintenance work are considered, aluminum paint will be found to be a solution for many of them. Because of its high light-reflecting properties, aluminum paint

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Our chemists and practical service men will continue to work in close cooperation with the research departments of army and navy aviation units and many aircraft manufacturers. No Berry formula will ever be changed except for a better one. We will continue to serve aviation faithfully and well, firm in the belief that the industry will soon take its place as a leader.

We will be glad to send responsible people our booklet, "Specifications for Aircraft Finishing," now in its second edition, revised and enlarged. Write for it—a brief note will do.

On the Wings of Progress/

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Varnishes Enamels and Lacquers

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will give the interior of factory, warehouse or storeroom a bright, clean and pleasing appearance. Owing to the fact that it does not darken and discolor in the absence of sunlight and is unaffected by sulphur containing gases, it will retain its original appearance for a long time.

Usually, only one coat of this paint will be required to complete an interior job, even though the surface is black. Its excellent spreading and hiding characteristics make it an efficient, as well as economical paint, for general use. As this paint resists weather well, overhead tanks, metal ventilators and the sides of corrugated iron buildings may be made to look attractive while being protected.

Miscellaneous Uses

Since aluminum paint is an excellent moisture proofer and an ideal primer for wood, it may be used to very good advantage as the first coat under successive enamel coats on ice boxes, show cases, kitchen cabinets and similar products. When made with a heat-resisting vehicle, this paint may be used on ovens, furnaces, waste-paper burners and other heated surfaces.

It is being used to protect as well as decorate a wide variety of products, such as lawn mowers, washing machines, derricks, electrical equipment, dairy equipment, flower trellises and many other articles. This bright silvery-appearing paint has many desirable characteristics that other paints do not possess and will aid in solving many paint problems.

Portable Sandblast Multiblaster

George M. Stowe, Jr., Buffalo, N. Y., announces a new piece of equipment of interest to firms that use, or have need of, apparatus for cleaning metal surfaces preparatory to finishing, or for sandblast equipment to be used on wood or stone. It is the portable sandblast "multiblaster" illustrated herewith.

One of the hose connections attaches to the compressed air line and the other connects with a

hose leading to the supply of sand or abrasive dust. The abrasive material used for sandblasting is syphoned from an open container or pile of material.

This same company also manufactures spray guns for use in spray finishing operations.

Instructions Plus Reasons

In the management of factory production departments, instructions and orders are issued which may seem unnecessary or absurd to the workmen. A certain reluctance, or lack of attention to detail in following such instructions, is often the result of the workmen not seeing the wisdom of doing the work in the changed manner ordered. Foremen become peeved because the men do not follow out management's instructions as readily as they might, but how many foremen take time to explain the why and wherefore of new orders?

Often it is argued that it is unnecessary to explain to the

Pee Gee

FLAT VARNISH

Print proof—Scar proof—Fool proof

— and you prove this by testing it at our expense. This is what industrial finishers have been wanting for years—a flat finish that can be recoated in one day. It dries hard as rock in six hours.

Finished articles can be packed for shipment day after application—it is absolutely print proof. Rubbed finish produced without effort—*and the price is right.*

We will furnish enough for a test without charge—send for it today.

PEASLEE-GAULBERT CO.

Incorporated

Louisville, Kentucky

VARNISHES STAINS FILLERS
LACQUERS ENAMELS

workmen the reasons back of such a move. There is much to be said in favor of this view, such as the saving in time, the decreased overhead, the fact that instructions are given to be obeyed, not to be questioned, etc.

But the more modern viewpoint is to take the workmen into the confidence of management—to a limited extent, anyway. A better feeling is generated by doing this, and greater production usually follows. Co-operation is essential to business success and to the holding of good jobs.

A copy of the notice reproduced below, reveals how a plant in Norwich, N. Y., handles matters of this character. The Berglas Mfg. Co. makes 500,000 toilet seats a year. It is a highly competitive business. When branching out, the firm goes to the men and explains the "why and wherefore," so that they really have no excuse for not carrying out instructions to the letter. It is a commendable method—more so because the safety thought is mixed with the productive appeal.

Bulletin No. 10

We are entering the competitive field of sheet and sprayed celluloid. This means that we must have your co-operation, your efforts to make not only better work but perfect work.

Out of the sheet celluloid seats we have finished to date, we find a number in which the woodwork is not up to standard, and all operators must concentrate on the thought expressed in the first paragraph.

We have been taking on a few new men and anything you may do to show them regarding their work, or any safety suggestions, will be considered a great help and will be much appreciated.

Please do not touch any of the machines or material pertaining to the White Work. This is important, for you may cause damage that you are unaware of at the time.

Employes are held responsible for the defective material produced in their respective operations. Employes who have been cautioned twice about doing unsatisfactory work, will be discharged a third time such action becomes necessary. Co-operation is absolutely essential if we are to compete successfully in this line of work.

Pay attention to safety! Accidents come from fooling and joking while you work.

This bulletin not only gives instructions, but it also explains the reasons for them.—D. A. Hampson.

Sanding Between Coats

It is much better to use waterproof sandpaper with water than to use oil and sandpaper because if all of the oil is not removed from the surface before the next coat is applied, there is danger of trouble in the finish later on—such as cracking and checking due to it not drying thoroughly all the way through.—J. M.

Refrigerator Truck Bodies

The following is a schedule of finishing refrigerator truck bodies that are made of wood:

1—A coat of oil-base primer.
2—Another coat of oil-base primer.
3—Knife in irregular surfaces.
4—A coat of oil-base surfacer.
5—A second coat of oil-base surfacer.
6—A third coat of oil-base surfacer.
7—Rub down with No. 6-0 Wetordry sandpaper.
8—Flow on a coat of long-oil enamel.—Joseph Cowan.

New "Four-Hour" Finish

Berry Brothers, Inc., Detroit manufacturer of varnishes, enamels and lacquers, announces the development of a new floor and trim varnish made on an entirely new principle. Because it dries hard in four hours, this new varnish is called "Four Hour Floor and Trim." According to Berry Brothers factory officials, it is entirely waterproof and will not turn white. Four hours after application of this new product the floor is hard enough to walk on.

Devoted to—
Questions
Answers
Suggestions
Comments and
Discussions on
Specific Problems

Questions and Answers

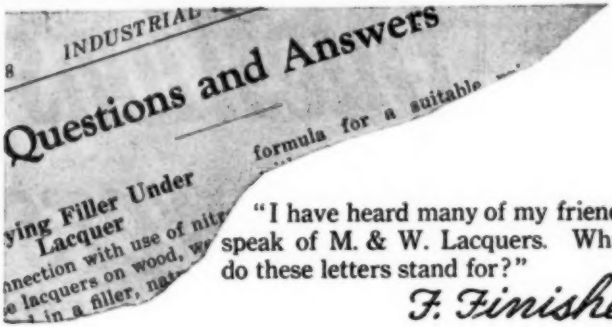
Information Service

Every issue of *Industrial Finishing* contains a wealth of practical information on various subjects of interest to users of finishes and finishing equipment, but from time to time new problems and questions arise, which demand prompt and authentic information. *Industrial Finishing* is in position to service inquiries, and the editor invites all individuals and concerns in the industry to make known their wants. Every effort will be made to supply the information desired, at no cost to you.

Questions are invited in regard to:

Finishing-room troubles or problems;
Where to obtain certain materials, supplies or equipment;
What methods or materials to use for certain results.

Additional comments or suggestions regarding questions, answers or articles appearing in this section, are invited.



"I have heard many of my friends speak of M. & W. Lacquers. What do these letters stand for?"

F. Finisher

These letters M & W have been identified with Quality Lacquer Products for many years among manufacturers of Furniture, Piano, Hardware, Metal and many other lines of industry.

The "M" Stands for "Many" years of experience in making "Metal" Lacquers, specially designed to meet each requirement for spraying or dipping.

The "W" is a symbol of "Worth" in "Wood" Lacquers. A Wood Lacquer for each class of furniture up to the highest grade of piano or finest piece of wood.

Together, the letters "M & W" imply
QUALITY, RELIABILITY and EXPERIENCE

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Los Angeles Office and Warehouse
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R. C. FLANIGAN, Southern Representative
111 Hillcrest Drive, High Point, N. C.

Questions and Answers

That Greasy Film After Rubbing Lacquered Surface

We are experiencing a little trouble in rubbing. How can we rub a lacquer surface without leaving a film of grease on it after the rubbing operation? We are using the following operations: 1—stain; 2—a wash coat of shellac; 3—fill; 4—apply one coat of heavy-body lacquer, upon which we do our rubbing.

We have tried different methods but without satisfactory results. We want our goods to be absolutely clean before they leave the shop.— P. F. Co.

My experience with rubbing lacquers, after they have been oil-rubbed, leads me to conclude that the following method is entirely satisfactory for cleaning the surface free from oil and grease.

Add to three gallons of hot water, ½-lb. of ivory soap flakes, ½-lb. of rottenstone and ½ pint of vinegar. Shake well as each ingredient is added. When applying this cleaner, shake well before using. Use cotton waste and rub briskly; then clean up with a piece of dry cheesecloth. If more polish is desired, dip a piece of cheesecloth in alcohol, wring it out almost dry and rub swiftly over the surface.

It seems to me that your finish is the cause of your trouble. There is not enough lacquer on the surface to keep the oil from penetrating into the wood, and this causes the oil to continue sweating out.

My method of finishing with lacquer is as follows:

Stain.
Wash coat with bleaching lacquer.
Sand.
Fill.
Apply one very thin coat of shellac.
Sand.
Apply a coat of lacquer.
Finish with another coat of lacquer.
Rub to polish.

You will find that the oil will not penetrate through this finish, nor cause the surface to present a greasy appearance. You may get a good finish with one coat of lacquer, but I have never heard of a lacquer with which one could get a satisfactory finish in only one coat—and I have used several different kinds of lacquers ranging in price from $2.75 to $3.75 per gallon.

It is important to note the fact that a high cotton content produces a lacquer which gives a superlatively tough and durable surface, but this gives a thin film, and it is difficult to rub and polish. A high gum content makes any lacquer give a comparatively heavy film which can be rubbed without difficulty.

Since the "body" of a lacquer is not determined by the amount of film-forming material present, the manufacturer can make it possible for the buyer to specify the amount of solids in the lacquer, and the proportion of the solids to be gums or nitro-cellulose. So it is up to the buyer to decide the degree of toughness, film thickness, etc., for the work required.

This will give you the most useful lacquer in connection with your particular finishing problems.

P. S. If you would like to have a sample of my finish, I will be glad to send it to you so you can see just how it is finished. I also have another formula which is more expensive, and if this one is not what you want, I shall be glad to furnish this other method on further notice. It cleans and polishes both, but is expensive.—T. R. Nall.

Varnished Piano Parts Print

Will you please tell me what is the best material to use with a caul to prevent it printing the varnish when clamping up cases? We have great trouble this way in our piano manufacturing. The piano ends are given four coats of varnish, which are sprayed on, wave rubbed and then flowed. From two to seven days afterwards they are clamped on to the strung backs.

We have tried felt, rubber, cork and paper between the clamps and the varnish, with no success. The work is invariably printed, and when rubbed with fine pumice and water, previous to rottenstoning, the print is sometimes taken out, but very often it comes back again.—J. M., Victoria, Australia.

In the United States, it is my understanding that the individual parts of upright piano cases are finished and rubbed completely before being assembled or glued together. Wooden clamps with comparatively large, smooth-bearing surfaces, are used to hold the parts together while the glue is drying. The faces of these clamp jaws are usually covered with a layer of felt similar to that used for covering pool and billiard tables. Any print marks, left in the varnish when the clamps are removed, are rubbed out and polished after the case is assembled.

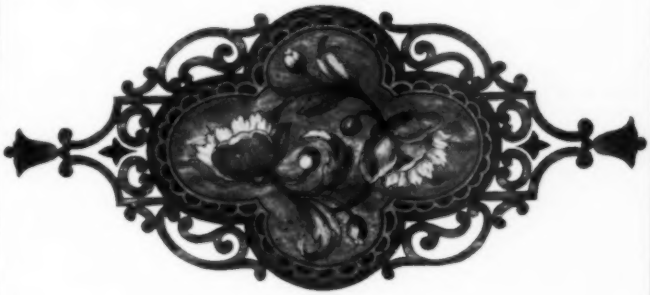
To reduce the amount of printing, very conservative schedules are followed, and high-grade varnishes made of hard fossilized gums or resin are used. The varnish coats are dried for weeks before the pieces are glued together and later rubbed.

You do not say how long each coat of varnish is dried before the next one is applied but I am inclined to believe that your entire schedule is rushed at bit too fast to entirely eliminate printing. From two to seven days after flowing is not sufficient time for the average piano varnish to reach its maximum hardness, and I am not surprised that your finish shows clamp marks.

My recommendation is to allow more time between coats of varnish and more time after flowing, before assembling. Different varnishes resist printing in different degrees according to the composition of the varnish. It might be well for you to try other piano varnishes than the one you are using. A properly made clear lacquer, used to replace the varnish, might also solve your problem without increasing the length of your schedule.—C. F. Merrifield.

Assuming that the varnish is thoroughly dry and hard through, we would advise that you use about four thicknesses of waxed paper and block on top of it. Don't use any felt. That should overcome your trouble if the varnish is O. K. However, it may be that you are putting through your jobs too fast. Even if the varnish is kiln dried, you couldn't

for Distinctive Furniture



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The appealing beauty of grace and dignity is expressed in the firm lines . . . the mellow Spanish Marqueterie colorings of this new series JAVA . . . . here is a decorative *motif* that lends quiet distinction and charm to any furniture . . . . . it embodies true artistry by *blending* into designs . . . by decorating *unobtrusively* . . . . . Available in all sizes . . . . for all furniture pieces . . . . Write for information.

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apply four coats in less than two days apart and be assured that each coat was thoroughly dry before applying the succeeding coats.

The way to finish a piano and get best results and avoid printing to the greatest possible degree, you should let each coat stand three days if you have no kiln, and as above indicated, apply each coat two days apart with kiln. Then let the finished parts stand seven days before coarse rubbing if kiln dried, and ten to 14 days if not kiln dried. After coarse rubbing, put in kiln over night before flowing. If you have no kiln, let stand three days before flowing. *And be sure and sand between each coat.*—The American Varnish Co.

Bleaching Walnut-Veneered Panels

We are interested in getting information on the most up-to-date method of bleaching walnut veneer, this to be done after the veneer is made up into panels and after the lumber is made up into store fixture work. Quite frequently we have very light-colored walnut jobs and have in mind that, no doubt, improvements have been made from time to time in the process of bleaching the wood preparatory to finishing. We would like to secure as much information on this situation as possible. Have you anything to offer us along this line? —G. R. S. E. Co.

These finishes vary in shade from one manufacturer to the other, depending upon the grade and color of veneer used. Due to this reason it can hardly be said that there is any definite standard shade. The shade may vary from a very light one to almost as dark as ordinary walnut. All of these shades, however, are known as French, Bleached or Hugenot walnut.

When using a very light colored veneer, free from dark streaks, it is not absolutely necessary to use a bleaching solution before starting the finishing operation. If bleaching is necessary, there are a number of satisfactory solutions for doing this.

Probably the best method of obtaining a uniform filler is to first apply a solution of potassium permanganate, made by dissolving one ounce to the gallon of water. Apply this solution freely and, while the application is still wet, apply a solution of sodium bisulphite made by dissolving two to four ounces to a gallon of hot water; it should be allowed to cool before using.

Another method of bleaching is to use the sodium bisulphite solution mentioned in the previous paragraph, without first using the permanganate solution, but this will not produce quite as uniform a color as where the two solutions are used in conjunction with each other. A solution of two to four ounces of sodium hypo-sulphite to a gallon of hot water, will give results comparable to those obtained with sodium bisulphite; or if desired, hydrogen peroxide, used full strength as obtained commercially, can be used with success.

Any of the above solutions should be applied cold and not hot, putting them on quite freely by brushing or sponging. It is good practice to sponge off the treated surface with clean water to remove any excess bleaching agent that may be present after

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the desired shade has been obtained. The wood surface should be allowed to dry thoroughly after the application of the bleaching agent, before proceeding with the finishing operations.

After the bleaching solution is thoroughly dry, spray on a thin coat of lacquer or white shellac, using about 55-lbs. air pressure. This stiffens the fibers and seals the wood so as to prevent oil from the filler penetrating and darkening it.

After this sealer coat has dried five hours or so, sand to a smooth surface and fill with a light-colored filler. If a medium or dark shade is desired, use a darker filler. Allow the filler to air dry 36 to 48 hours or kiln dry over night and then finish as outlined in later paragraphs.

If the woodwork to be finished is made up of a combination of gum and walnut wood, the finisher will be obliged to use his ingenuity to see that the color of the gum wood portions matches or at least harmonizes with that of the walnut. The method of doing this will depend upon the kind of gum wood used and upon the grade of walnut. If red gum is used, it may be advisable to treat it with either a weak picric acid solution or a sodium hyposulphite solution, to which one dram of water-soluble blue nigrosene has been added, to neutralize the red tone of the gum. White gum can be livened up, if necessary, with a weak solution of water-soluble scarlet. Black gum can be bleached, to a certain extent, with the bleaching solutions recommended for walnut. On sapwood, it may be necessary to use an over-toning stain over the filler to make the color even and uniform.

If the color of the gum harmonizes closely enough with that of the walnut, no special treatment will be necessary before the filling operation, although a very thin coat of lacquer before filling will keep the gum parts lighter, especially wherever end wood is encountered. After the filling operation, proceed as outlined for walnut wood.

After the filler has dried until it is thoroughly bone hard, the finish should be brought up with lacquer, a light colored varnish or shellac.

For bringing up a lacquer finish, spray on two or more coats (depending upon the body desired) of wood lacquer full-body at about 55-lbs. air pressure, applying one coat a day for best results. After the last coat has dried over night, rub with pumice stone and oil. This method will give as light colored and as durable a finish as can be obtained over veneer of a given color to start with. If the shade is not light enough after the work is finished, either lighter-colored veneer will have to be used or the veneer will have to be bleached more, provided a very light filler has been used.

The varnish finish can be produced by spraying or brushing two or more coats of a so-called "maple varnish" directly over the filler, keeping in mind that the more coats of varnish applied, the more work will be discolored. To get more body on the work, some finishers use a two-pound cut of white shellac over the filler and under the varnish. Twenty-four hours should be allowed between each coat of varnish and 48 hours or more should be allowed after the last coat, before rubbing with pumice stone and oil.

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A most unique and distinctive finish!

Pioneered as a leatherette finish for radio horns, its variety of attractive combinations has brought it into use for many other articles, such as radio cabinets, furniture, fixtures, novelties, toys, etc.

Ease of application—uniformity of pattern—combinations to suit your particular requirements, are outstanding qualities of BREVOKRAK.

Thorough-going demonstration made at your plant if desired.

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BREVOLITE lacquers and lacquer enamels for the wood finishing trade are hard wearing, good covering materials.

A finish made of a combination of lacquer and varnish can be brought up by using one or more coats of wood lacquer, full-body, directly over the filler and then putting on one or more coats of "maple varnish." Forty-eight hours or more after the last coat of varnish is applied the surface can be rubbed with pumice stone and oil.

A finish brought up in this way will be tougher and more durable than if a coat of shellac is used over the filler under the varnish, and the color of the finished work will be lighter than if varnish only were used. Care must be taken, however, that all of the lacquer solvents are out of the lacquer film before the varnish coats are applied.

Again it should be emphasized that no definite recommendations can be made for bleaching the wood to a desired shade. The color of the finished job will depend, to a great extent, upon the grade and color of the veneer used and, to even a larger extent, upon the resourcefulness of the finisher himself.—R. L. Masterson.

Why Does This Varnish Chip So Easily?

I am having trouble with varnish chipping. I can take my finger nail and chip the varnish off easily, especially on mahogany. I stain with an oil stain supplied by a nationally known manufacturer of lacquers. I cut this stain in benzol, then give two coats of white shellac followed by five coats of varnish—that is spraying varnish which makes a fine finish—but I can take my finger nail and press the varnish off with very little trouble.

Kindly let me know the cause of this and how to correct it as I am up against it for fair. Let me know as soon as you can.

If you think it is the oil stain or short varnish, mention it in your reply. I also put one tablespoonful of dryer in each quart of varnish.—I. L.

I will give you a few explanations as to varnish chipping but, before I start, I might remind you there are many different things that cause varnish to chip and hairline. It would be impossible to go into details with them all.

First of all, benzol should never be used under varnish. Benzol has a tendency to make varnish sweat and it continues bleeding through and softens up the varnish.

Second, the varnish being used may be short of gum.

Third, the stain may not be allowed to dry long enough before the first coat of shellac is put on.

Fourth, you may be using a cheap shellac.

Fifth, you should let each application of varnish dry 48 hours between coats. The finishing room should be heated to 80 degrees F., and there must be some moisture in the air, too, as this is very essential in the varnish room. The relative humidity of the atmosphere may be increased by adding moisture to the air in any form. Some concerns use open water pans fastened to the radiators; others improve on this by placing large wicks, made of burlap or other material, in the water pans to increase the surface from which evaporation takes place; still others allow steam to escape in the air; the last named method, I think, is best of all.

The most frequent cause of checking or chipping is due to soft or not thoroughly dried under coats. Even when the utmost care is used in preparing the surface and in applying the coats, the danger is not entirely eliminated unless each coat is at least as elastic as the preceding ones, and unless each coat is thoroughly dried all the way through—not merely on top.

Checking or chipping can be traced, many times, to a desire to apply the finishing material too heavily. It is better, from the durability standpoint, to apply three thin coats of material than to put on two heavy coats.

Where a heater is used on the spray booth for warming the varnish before it is applied, there is often a tendency to apply the varnish too heavily. In either case the varnish may not harden through properly and, as it dries out thoroughly later on, checking and chipping may develop. Lack of proper drying conditions, such as the proper temperature and relative humidity, may prevent the coating from hardening through, and this will give trouble later.

I would not use in my finishing room a varnish to which I had to add dryers and other materials to force it to dry. When so many varnish companies are making perfect drying varnishes, why fool with one that does not dry?

Dryers should never be used in varnishes after they have left the varnish plant. Varnishes are heated to a certain heat and each ingredient is added in the varnish while it is cooking; you should not try to alter varnish, except by adding turpentine (and the purest of it) when necessary.

Most paint and varnish ma-

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to take the place of Shellac—Lacquer—First Coaters—Shellac Substitutes—also recommended for final finishing.

It's new and different from anything now on the market. Has successfully met practical tests in several large Chicago plants.

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Rubbed Varnish Job
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terials have a tendency to dry from the top down, that is, they will harden on top within a few hours, but underneath they will be more or less soft, requiring considerable time before they are hard through the entire thickness of the coating. If another coat of finishing material is applied before the oxidation of the previous coat has proceeded far enough, the new coat begins to harden from the top down and soon forms a dense layer which prevents oxygen from easily getting to the bottom of the first coat of only partially-dried material.

If the last coat stands long enough it will harden through and through, yet the bottom portion of the first coat may not be thoroughly dried. If the finish is subjected to a change in temperature, or if the amount of moisture in the wood is increased or decreased, there will be an expansion or contraction of the wood and the finishing material will have to contract or expand also. Now the portion of the finish that is not thoroughly dried will expand or contract over a greater distance—with a given change in temperature—than will the hardened top film, without cracking. As a result, the elastic limit of the top film may be exceeded and checks or chipping will appear.

Regardless of whether any great changes in temperature or moisture content take place, there is danger of checking or chipping developing under the above conditions, due solely to the fact that as the undried portion of the film becomes dry it will change in volume. Since the top film is hard and already under strain, similar to that of a rubber band drawn tightly over a wooden surface, it

may not be elastic enough to change shape with the underneath portion of the film and it will crack in places as the underneath portion changes in volume.

Chipping and cracking are caused by a change in volume of an underneath portion after the top film has become hard, as the drying of clay mud on a river bank under the hot sun. The top film of mud dries first and is baked very hard by the sun. As it dries it shrinks in volume. Later, as the drying proceeds downward, the top film of hardened mud is no longer sufficiently elastic; it cracks into sections of irregular size and shape, the cracks becoming larger and deeper as the drying proceeds.

The cracking of paint or varnish and the subsequent chipping off is somewhat similar to this cracking of baked mud, except in the case of the paint or varnish, oxidation of the oils and gums is responsible for the hardening effect, while the mud becomes hard and non-elastic principally through evaporation of the moisture by the hot sun.

Any condition that causes a portion of the undercoats to be softer or more elastic than the top coats, usually results in cracking and later, chipping off. If the coats are heavier in some spots than others, much the same effect will be produced in those same spots. If the top coat of varnish or paint contains less oil or is "shorter in oil," or less elastic than the bottom coats, exactly the same conditions exist.

If you would use water stains, you would probably eliminate a lot of this trouble. If you wish it, I will be glad to send you a sample of my finish and the materials used on the sample.—T. R. Nall.

DACONITE LACQUER

a type for every finish

Daconite is our brand name for a series of lacquer finishes, each made as fine as lacquers can be made. Daconite Lacquer is warranted to contain pure *new* nitrocellulose. There is no recovered film scrap, smokeless powder dope or other substitute used in its manufacture.

NITROLITE LACQUER

Nitrolite Lacquers are also made in a full line. They are better-than-average lacquers, sold at a surprisingly low price. Nitrolite is sold under the same warranty as Daconite.

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AEROLAC

A Nitrocellulose Compound

Has Good Odor
Will reduce 50%
Flows freely
Sands easily

Use as a wash coat
Use as a prime coat
Use as a last coat
Price Right!

OUR GUARANTEE
Send for five gallons—If not as we claim, return it.

Jamestown Wood Finishing Co.
Jamestown, N. Y.

New Air-Driven Agitator

Thorough agitation of all finishing materials contained in drums and barrels, as shipped from material manufacturers, is an important requirement. When all solvents and pigment particles of a finishing material in a container are not uniformly distributed throughout the mixture, before being transferred from barrels or shipping containers, the

The air motor, air line connections and top of agitator unit are shown mounted in position on the head of a shipping container.

result is almost sure to be uneven tones of colors and possibly uneven adhesion properties. A weakness of this kind, in the applied coating of material, is equivalent sometimes to the absence of one or more essential ingredients.

The power agitating unit illustrated herewith has been brought out by Binks Spray Equipment Co. of Chicago, to prevent any possible faults or defects of applied finishing materials, due to the lack of proper agitation before materials are taken from shipping drums or barrels.

The new power unit is especially designed to be adapted to any standard lacquer, varnish or paint barrel or drum equipped with hand-agitation facilities and

1¼-in. I.P.S. protecting caps. Fittings for special-size top openings are also available. The agitating unit is operated by a powerful air motor with a control valve to regulate its operation at various speeds. According to the manufacturer "its mechanical construction is simple and foolproof." The air motor has only three working parts with hardened steel (ground) wearing surfaces. It requires no further attention than occasional lubrication, and consumes approximately 3-cu.ft. of air per minute at high speed.

The agitator shaft is driven through a bronze steel reduction gear thoroughly packed in lubricant. All bearings in this assembly are bronze and sealed at the ends to prevent any abrasive action by deposited materials. It is quickly attached and detached.

A New Touch-Up Spray Gun

The Alexander Milburn Co., Baltimore, Md., announces a recently developed touch-up gun for general use where a fine spray is required. The Milburn type K-Jr., as illustrated herewith is well balanced, has stable base and is easily handled.

According to the manufacturer, "slight pressure on the trigger produces a very fine mist, so completely atomized that the color is blended with the surrounding painted surface." The gun can be adjusted to procure a hair-line spray for the finest kind of work. The gun will operate on air supplied from an air compressor as small as ¼-h.p.

Six feet of air hose, with connections, is furnished with the gun. Various containers either aluminum or glass can be fur-

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nished so that many different colors of materials can be kept on hand ready for use. Each container can be had with an air-tight cap so that the paint can be kept in condition while in the cup. Aluminum cups are 8-oz. in size; glass containers, 8, 16 and 32-oz. sizes.

Showing the new gun attached to a small container and a coil of air hose.

Mechanical polishing of lacquer coats is becoming increasingly popular.

"Cleanest Town" Contest in 1928

A prize trophy cup is offered in each state by the National Clean Up and Paint Up Campaign Bureau in a contest sponsored by the Division of Community Service, General Federation of Women's Clubs.

In each state, the award will be made upon the progress made during the 1928 campaign, to be shown by "Before and After" photographs and specific reports of the achievements on report blanks. The items to be reported include houses painted, walls painted, floors painted or varnished, woodwork painted or varnished, porches or stairs painted or varnished, fences painted, outbuildings painted, screens painted, roofs painted, walls papered or kalsomined, and walls cleaned.

"My intention is to follow this with another article in which I will dwell on the different types of ovens —gas, direct and indirect heat, electric and fuel oil. Also, on the proper use of materials regarding proper drainage to prevent sags and runs, and the use of the thermometer and hydrometer. Also the importance of proper control of heat and time. Probably also a few hints with reference to drying castings, etc., before finishing for baking."

—THE AUTHOR.

Some Phases of Baked Finishing

Calling attention to some of the characteristics, merits and uses of baked finishes for various purposes and revealing information on light colored and varnish finishes which are baked

By C. Dan Youngs

KEEPING in step with the rapid and almost unbelievable strides which industry has made in the last 40 years, the field of industrial finishing has been almost completely revolutionized. Where finishes formerly were applied by hand and dried within whatever time the crude manufacturing methods then permitted, it is now rare indeed to find a manufacturer who is not alert enough to take advantage of whatever acceleration he can secure in his finishing rooms.

Realizing the need for speeding up the finishing of manufactured materials, there was gradually evolved a process of hastening the drying which has culminated today in baking or forced drying of finishes by means of either electric, gas or oil heats. Naturally, the first gas ovens developed were very crude. Serious difficulties were experienced in turning out work in a successful manner but, as practice and a study of possible methods followed, these obstacles were gradually overcome. The lack of adequate heat control, the necessity of proper ventilation, the need for even distribution of the heat and proper insulation of walls—all these requirements were finally taken care of, and the result is the oven of today.

Everything is not yet perfect in all respects but, as time brings forth new developments in the field of industry, equipment and methods employed in the baking of finishes will also develop. It is with a view of pointing out a few of the most common phases of baking finishes that this article is written.

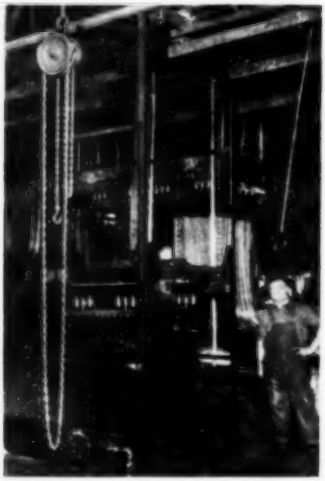
Why Finishes Are Baked

The widespread use of baked finishes is evident when one looks about and notices the many things, common in everyday life, which have the baked finish. Automobile parts, tools, buttons, hairpins, typewriters, adding machines, radios, sewing machines, beds, and many other articles too numerous to mention are included.

Baking at heats ranging from 100 to 600 degrees, according to the class of the articles and the finish desired—this makes the finish much more lasting and impervious to wear and tear. The

appearance is also much improved and any degree of finish desired—flat, semi-gloss or gloss—can be obtained. These arguments are from the standpoint of the ultimate purchaser, but their effect upon the manufacturer is still more pronounced.

In the first place, he can speed up his production appreciably. Where formerly he had to wait anywhere from eight to 36 hours for drying, now it is seldom that an article cannot be finished, baked and entirely dry in about three hours. This means increased production and it also means better production control. Management knows just how much time to allot for finishing operations, and this time does not vary according to changes in the atmosphere. Weather has absolutely no effect upon the baked finishing process as regards drying time.



Chain hoists are frequently used in connection with the raising and lowering of dipping racks loaded with articles to be dipped into the tanks of finishing material.

Then again, less floor space is required for drying. Management can condense the space required for drying operations and use the left-over space for other purposes.

Different Materials Baked

With the possible exception of nitro-cellulose lacquers, there is probably no class of finish that a paint manufacturer cannot make for baking purposes. By this I do not mean that all kinds of finishing materials can be baked, but rather that all classes of material can be made so they can be baked. A few of the most widely used are listed here.

Black Baking Japan

These are used mostly on fenders, typewriters, sewing machines, telephones, etc. Their use is widely diversified, and their application ranges from one to four-coat work. Tne first coat is a black baking primer, followed by the intermediate coats. A good second coat can be made in the shop by mixing equal parts of the primer and the finishing coat, which gives a higher gloss than the priming coat. This is followed by one or two coats of the finishing japan. All coats are baked; they are usually sanded or rubbed between each coat.

Blacks will stand a much higher baking temperature than whites or colored baking enamels, without affecting in anyway the protective surface. They bake absolutely hard; try to scratch your telephone or typewriter if you doubt this.

White Baking Enamels

Furniture for hospitals and for doctors' and dentists' offices, scales, display racks and countless other articles finished in

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white—all these have gone through the baked finishing process. The baking of whites is entirely different from that of the blacks. Due to differences in the raw materials, whites will not stand anywhere nearly as high baking temperatures as blacks. They can rarely be baked over 150 to 175 degrees without turning to a cream or gray color. However, the final baking at these lower heats leaves the surface as hard and impervious to wear as the blacks. Whites are built up from a primer coat, in a similar method to that described for blacks.

Colored Enamels

The use of colored baked enamels is also widely varied, these materials being used for anything which requires a hard finish in color. As a rule, they are purchased already made up, although some establishments still make their own, either from colors ground in oil or in japan. These colors are thinned down with turpentine and then mixed to finishing consistency with baking varnish. It is preferable to get them ready mixed, as it is easier that way to always have standard uniform colors.

The baking of these color enamels requires differing periods of time as the lighter tints will not stand the higher heats of the darker shades, which sometimes go as high as 350 degrees. If a finisher is in doubt as to the degree of heat the different colors will take, a few trials, or information from the manufacturer will give him correct data.

Another widespread use for baking enamels is for finishing metal office furniture, filing cabinets, lockers, etc. This furniture is usually finished in some shade of olive drab or olive green—generally in a semi-gloss. The range is from one to three-coat work, depending on the class of finish desired.

At the baking ovens.

Baking Varnishes

These finishes are used as an additional protective coating over a previously finished surface and, in some cases, to give a gloss as well, where the undercoat is flat. The baking temperature must be watched carefully, as on the lighter colors—on flake white for instance—they will turn brown if baked at too high a heat. The various problems in this connection have been the cause of much study and careful formulation on the part of manufacturers of these finishes. Varnishes suitable for baking are also used in shops where enamels are mixed, as a vehicle for baking enamels.

Crystalizing Finishing

Crystalizing finishes are entirely different in character and in usage from any other material that is baked. That they are extremely popular can be seen by noticing the wide variety of articles they are used on today, for example, radio cabinets, eye-

Boston Industrial
Baking Enamels

These Enamels, which are made in a variety of colors, are intended to bake at a temperature of 250 degrees in from four to five hours. Thirty minutes after baking, they may be packed for shipment. They give a remarkably hard, durable finish; are tough and pliable and will give perfect satisfaction whether used on wood or metal.

There is another feature in connection with these Industrial Baking Enamels which is worthy of consideration and that is the fact that they are washable. Dirt can be removed from them with a damp cloth and the Enamels will shine with their original lustre.

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Boston Varnish Company

39 Everett Station **Boston, Mass**

glass cases, eliminators, cash registers, adding machines, electric heaters, etc. This subject is so involved that it will be gone into more thoroughly later, in another article.

Methods of Application

There are in use today three major methods of applying finishes for baking; the most popular, I believe, is the spray gun. It has been said that the spray gun will turn out as much work in one day as was formerly done by six men using hand brushes. Spraying is a field in itself and has no place in this article beyond mention as a means of finish application.

Another method widely in use is the dip method. A dip tank large enough to completely receive the article to be finished, is provided and filled with the finishing material. Usually, where the objects are large, a hoist is placed above the tank and used to let down and pull up the articles to be immersed.

Further improvement along this line includes the provision of an overhead track to facilitate the speedy movement of material away from the tank and to the ovens. The overflow or drippings from dipped articles drops onto a drain and is returned to the dip tank.

One of the principal objections to the dipping process is the necessity of keeping the finish thoroughly stirred in order to keep the pigment in suspension—to prevent it from settling to the bottom. But this agitation, which is usually done by compressed air, also tends to stir up any dirt that may be in the tank, also, with its consequent specking of the finish. It is, of course, essential to good finishing that the material be kept absolutely free from dirt or dust, so a tank should always be kept covered when not in use, and thoroughly cleaned frequently.

Another system of finish application, not in such frequent use now, is the so-called "Floco" system. This is a means whereby the finishing material is pumped up from a tank through a tool held by hand, with lips usually about 6 or 8-in. long, from which the material is flowed on; the excess material is returned to the tank to be pumped up again. In this method also, the danger of dirt and dust must be guarded against.

Equipment Display Room Opened in Louisville, Ky.

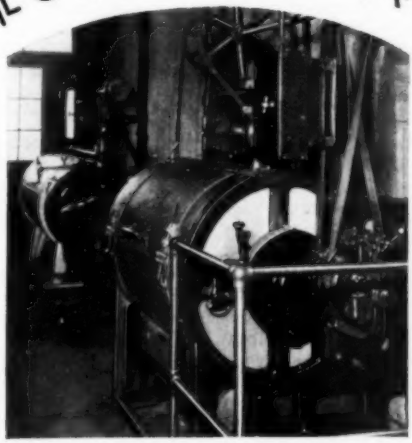
The Equipment & Supply Co., manufacturers' agents (P. O. Box 110 Baxter Ave. Station), Louisville, Ky., announces the opening of offices and display room, centralizing all forms of mechanical equipment, machinery materials and supplies.

New Foot Guard

Statistics show that 21 percent of all accidents are to feet and toes, and heretofore no type of protection has been offered which could materially reduce such injuries. These facts have prompted the development of a new foot protecting device which is known as the Sankey corrugated foot guard. This metal guard forms a turtle back cover over the shoe so that the impact of a falling object is withstood by the rim which rests on the floor.

The guard is made of 16-gauge special steel or "Rigidlum", an aluminum alloy, and is corrugated for super-resistance for shock. It is tested to resist 300 foot-pounds—the maximum load which a man can carry. The weight of a steel guard is 16-oz.; of a rigidlum guard 6-oz. The guard is fastened to the foot by a strap and can not be kicked out of place. It fits either foot, any type or size of shoe, and is comfortable to the wearer. This new guard is a product of Pulmosan Safety Equipment Corp., 174 Johnson St., Brooklyn, N. Y.

RENEW



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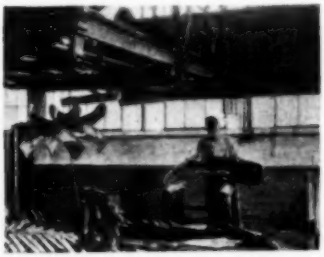
Automobile Fenders Finished in Baked Japan

Explaining the usual methods of dipping and baking fenders, pointing out why rust soon attacks the under sides and creeps around the edges, and suggesting how to make the baked japan finish durable for a longer period of time

By C. S.

WHILE visiting our latest Automobile Show and observing the new finishes and color schemes, I was again impressed by the beauty of the baked-enamel fenders which most of the makers still use on their standard models. To my mind there are a number of reasons why automobile manufacturers use this finish. First is its beauty and second, its cheapness to produce, as it is only a two or three-coat dip proposition, with no sanding or rubbing between coats, and it is a hard-surface finish that *holds its luster where it hangs to the surface.* These words in italics prompt me to write on this subject.

Baked enamel holds its luster where it hangs to the surface but, in many cases, it doesn't hold to the surface very long before rust gets it. Since an automobile fender is exposed to harder usage than the body of a car, we must consider the preserving powers of finishes applied to the surface. It is a known fact that many baked enamel fenders rust and flake off in a very short time while usually the body of the car stands up good, regardless of whether it is varnished or lacquered.



Fenders in the automotive bake-finishing department.

Usual Dip Method—Results

Let us stop to ask why this happens. First we must consider the amount of baked enamel that is applied to the surface of a fender at the automobile manufacturing plant. The baking japan, of course, must be at the proper temperature for dipping. It also must be thinned considerably to obtain the proper flow and drip on a large surface, such as front fenders.

These fenders are hung so they will drain from the bottom edge, at a point where they are fastened to the running board. Special hooks are fastened at the top ends of the front fenders and then the fenders are dipped into the baking japan very slowly. The weight of the baking japan on the surface, while draining, has a tendency to pull or stretch the japan to a very thin coat at the top edges and also down from the edges for a considerable distance.

After applying two or three coats in this same manner and baking each coat, it is evident that on the top ends of the fender, where the material has drawn out thin, the finishing material is not very thick. In my opinion, finishes applied in this manner have no more body or thickness than one coat of auto-body varnish when dry.

Now the under sides of fenders receive no more coats of material than the tops, but they are subjected to more severe service and are seldom cleaned, once the car is in use. It is only a matter of a few months, usually, when the finish on the under sides of fenders begins to show the effect of wear and tear. Rust starts to do the damage, and slowly creeps around the edges to the top surface.

Comparative Endurance

Let us make a comparison as to the durability of the varnish or lacquer-finished fenders, compared to those finished with baking japan. First of all, the lacquer or varnish finish is built up with primers and fillers; this gives a heavy-bodied protective coating that will more easily resist any bang or scratch to which it is subjected. Such damage seldom goes down to the metal. On the other hand the baked-enamel fender has a harder surface but is not heavy enough body when it leaves the factory to resist weather as long.

One very fine scratch down to the metal will invite rust to start, unless it is touched up immediately. I believe the old varnish finish on fenders would prevent rust for a greater length of time than the usual factory baked-enamel finish of today, although the var-

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nish surface will lose its luster in a comparatively short time. However, baked enamel fenders, finished properly, will give even our modern lacquer a run for the money as to durability. Baked enamel finish has the advantage as to enduring luster and low production cost.

I hope readers of INDUSTRIAL FINISHING will not misunderstand this article, as I am not belittling the qualities of baking japans. I believe baked japan is one of our best and most durable finishes today—if properly used. Baked enamel offers durability as well as beauty, but it should be used so that it will answer its purpose satisfactorily in all respects.

Suggested Improvement

I might suggest one or two things that will permit baked japan to give us more durability and resist rust longer on the automobile fender today. First, I would suggest three coats of baked enamel, the first coat to be a "rubber undercoater" used at heavy-spraying-body consistency, and sprayed on both sides of the fender. This, when baked, will leave considerable body and a uniform coating on the fender. Then follow with two coats of finishing material dipped. This method has proved to give a finish of greater durability, but at a slightly higher cost in production.

On the other hand, a durable, baked-enamel fender job can be obtained with the dip method by applying at least two extra coats. This, of course, will put more body on the surface, but it will also bring up the production cost, as this would require two extra bakes and handlings.

Wh[illegible] a number of coats are

applied in this manner, care must be taken in baking each coat so as not to bake it too hard, as I believe this is one of the causes of some baked enamel finishes chipping and flaking off in time.

When the manufacturer supplies a certain grade of baking enamel and recommends certain baking temperatures, we must remember that usually this material must be reduced from 25 to 30 percent. This thinning of the material generally allows the baking temperature to be lowered slightly, and the baking time can often be shortened; this will also prevent brittleness. Never bake japan at a certain temperature for one hour, if the same results can be obtained in 45 minutes at the same temperature.

Bleaching Walnut

In finishing furniture one often encounters light and dark sections or spots in the wood or veneer which, if not taken out, will make the finish look blotchy. The proper remedy is to bleach the dark sections.

In bleaching, it all depends on how light the finisher wants the wood to be bleached—and to what shade. One must also take into consideration the amount of labor the job can afford whether it must be done at a price, whether the piece must be exact, etc.

A good bleaching compound is made as follows: In one pint of boiling water dissolve 2-oz. of oxalic acid and ½-oz. of pyrogallic acid. When thoroughly dissolved and still hot (make sure it is hot) apply to the dark portions of wood; let it dry thoroughly and if it is not light enough, repeat the operation until the proper shade is obtained.

Always remember that the in-

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gredients in this formula must be well dissolved and that the preparation must be applied hot, regardless of how many applications may be used.

To arrest the action of the bleaching material, wash the wood surface with hot water and let it dry.

Another method of bleaching has proved to be satisfactory for large surfaces on high-grade furniture. To bleach American walnut to the color of Circassian walnut, coat the surface with a liquid composed of 2-oz. of chlorated lime to one pint of hot water. Allow it to dry, wash it with hot water and brush on a solution of 3-oz. of oxalic acid to one pint of water; allow the surface to dry well, wash with water and, while it is still damp, brush on a coat of peroxide. After it has thoroughly dried, wash it well witn water, allow it to dry, and sand paper to a smooth surface. Repair all imperfections and the bleached surfaces are ready for staining or filling, depending on what shade is desired.

Decoration in old red, antiqued lightly with black, shows up well on a walnut background.

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